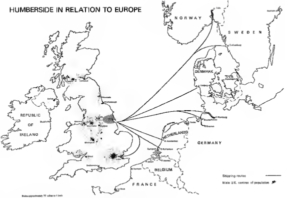
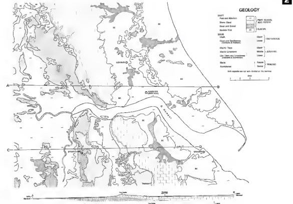
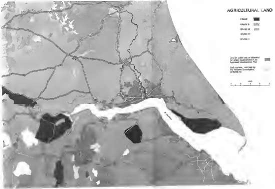
HUMBERSIDE IN RELATION TO EUROPE



The map shows Humberside's position in relation to the United Kingdom's main centres of population and its communications with Europe.



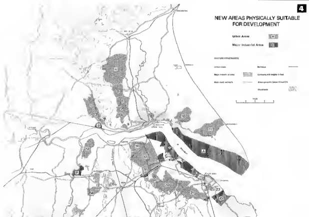
Derived from maps and information supplied by the Institute of Geological Sciences


AGRICULTURAL LAND
GRADE I
GRADE II
GRADE III
GRADE IV
GRADE V
Land in urban use, or allocated for urban development in an Approved Development Plan
Golf courses, land held by the Forestry Commission, airfields etc.
miles
R. Humber

The grading of agricultural land quality is in accordance with the classification devised by the Ministry of Agriculture, Fisheries and Food.

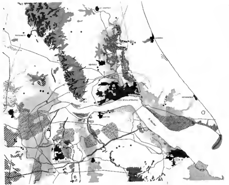
4

NEW AREAS PHYSICALLY SUITABLE FOR DEVELOPMENT

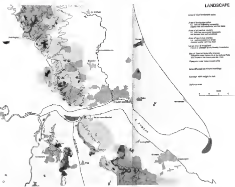


The industrial areas are those listed in Table 4a; the areas for other urban uses are listed in Table 4b. In the event of decisions to undertake major development, it would be physically feasible for the choice of the large new areas that would be needed for building to be made from within these broad areas of search.

PHYSICAL CONSTRAINTS


RELIEF
Over 200 feet
Below 10 feet
Land liable to flood
Steep Slopes (Greater than 1 in 3)
GRADE 1 AGRICULTURAL LAND
PEAT
SITE WITH PERMISSION FOR MINERAL WORKING
SITE OF SPECIAL SCIENTIFIC INTEREST
Existing
Proposed
MAJOR CHEMICAL, PETRO-CHEMICAL, CEMENT AND STEEL WORKS
AIRFIELD
DEFENCE TECHNICAL SITE
WAR DEPARTMENT TRAINING AREA
ELECTRICITY TRANSMISSION LINE
Existing or under construction
Proposed Route
GAS PIPE LINE
Existing
Proposed
OIL PIPE LINE
MAJOR BUILT UP AREAS

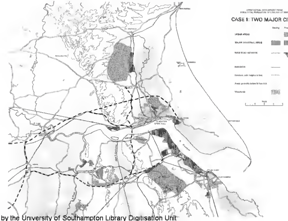
The constraints shown are a selection of factors which could affect the availability of land suitable for large-scale residential development.


LANDSCAPE
Area of high landscape value
Area of landscape value i.e. with an interesting topography, mature trees and woodlands, and fine views
Area of attractive country i.e. with less pronounced topography and fewer trees and woodlands
Area of low lying country i.e. well-managed land of less scenic quality, with few trees
Large area of woodland owned or managed by the Forestry Commission
Site of Special Scientific Interest scheduled under Section 23 of the National Parks and Access to the Countryside Act, 1949
Viewpoint over open countryside
Area affected by mineral workings
Contour with height in feet
Built-up area
Miles
Pocklington
Driffield
Beverley
Hornsea
Kingston upon Hull
Withernsea
Barton-upon-Humber
R. Humber
Goole
Grimsby
Cleethorpes

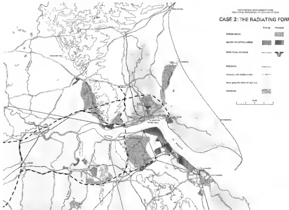
This summary of landscape character is mainly subjective

7

CASE 1: TWO MAJOR CITIES


HYPOTHETICAL DEVELOPMENT FORM
FOR A TOTAL POPULATION OF 1,250,000 AT 2001
Existing
Proposed
URBAN AREAS
MAJOR INDUSTRIAL AREAS
MAIN ROAD NETWORK
RAILWAYS
Contours, with heights in feet
Areas generally below 10 feet O.D.
Woodlands
Miles
KINGSTON UPON HULL
WITHERNSEA
CLEETHORPES

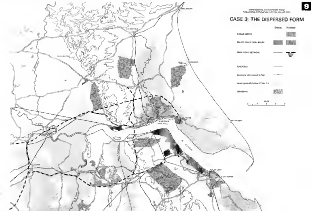
In this hypothetical case major new development will be in the new cities — 'Lockington' near Beverley and 'Limber' between Grimsby and Scunthorpe.


HYPOTHETICAL DEVELOPMENT FORM
FOR A TOTAL POPULATION OF [illegible] AT 2000
CASE 2: THE RADIATING FORM
Existing
Proposed
URBAN AREAS
MAJOR INDUSTRIAL AREAS
MAIN ROAD NETWORKS
RAILWAYS
Contours, with heights in feet
Areas generally below 10 feet O.D.
Woodlands
MILES
KINGSTON UPON HULL

In this hypothetical case major new development would be radial from Hull on the north bank; on the south bank there would be a new city — "Barton" — opposite Hull.

HYPOTHETICAL DEVELOPMENT FORM
FOR A TOTAL POPULATION OF 1,150,000 BY 2001

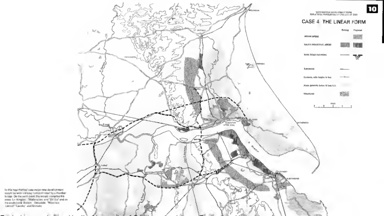
CASE 3 THE DISPERSED FORM



In this hypothetical case major new development on the north bank would be in three new towns around Hull — North Cave, Lockington and Hornsea; on the south bank there would be a new town — Limber — centrally placed between expanded towns at Grimsby and Scunthorpe and a small new town — 'Barton'

HYPOTHETICAL DEVELOPMENT FORM
FOR A TOTAL POPULATION OF 1,750,000 AT 2001

CASE 4 THE LINEAR FORM

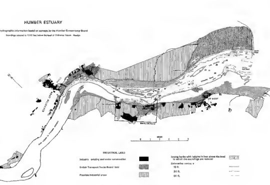


In this hypothetical case major new development would be within a long corridor linked by a Humber bridge. On the north bank this would comprise the areas Cottingham 'Walkington' and 'Skidby' and on the south bank Barton 'Deepdale' 'Wootton Limber' 'Laceby' and Grimsby

HUMBER ESTUARY

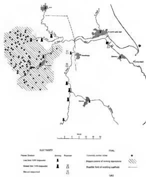
Hydrographic information based on surveys by the Humber Conservancy Board

Soundings reduced to 10.00 feet below the level of Ordnance Datum (Newlyn)

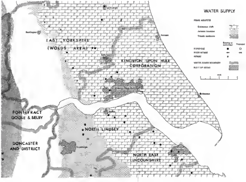

N
KINGSTON UPON HULL
Spurn Head
GRIMSBY
INDUSTRIAL LAND
Industry existing and under construction ■
British Transport Docks Board land ▩
Possible industrial areas ▥
Drying banks with heights in feet above the level to which the soundings are reduced
Bathymetric contour
18 ft.
30 ft.
60 ft.
MILES
0
1
2
3
4
5

The depths of water available at H.W.M.N. are between about 11 feet (at Spurn Head) and 17 feet (at Hull) greater than the depths below chart datum given on the map. The map shows the main existing and already proposed industrial and dock areas. It also indicates the extent of large areas of flat land near the estuary which could have use for major industrial developments.

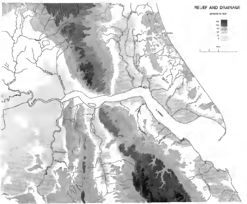
SOURCES OF ENERGY



The Study Area adjoins a major electricity generation area and has facilities for the import of oil and natural gas and the export of coal.



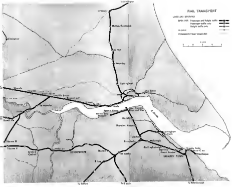
Most of the Study Area's supplies have come from the Chalk. Kingston Upon Hull Corporation abstracts water from the River Hull and, in 1968, the North East Lincolnshire Water Board commenced abstraction from the Great Eau (intake outside Study Area). There are proposals to obtain some supplies from the River Ancholme.



RELIEF AND DRAINAGE

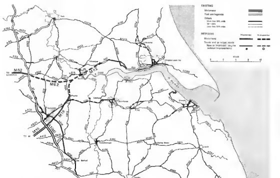
HEIGHTS IN FEET

The 10-foot contour is not closely definable: the areas shown are those where the ground level is below 10-feet Ordnance Datum.



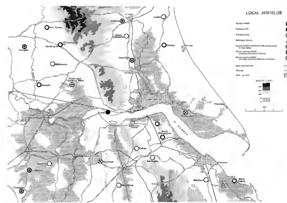
The situation shown is that in 1958

MAIN ROADS



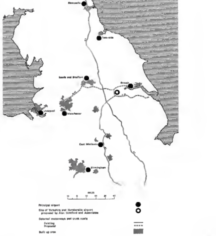
The proposals shown cover the main schemes in the Ministry of Transport's road programme and preparation pools in 1968.

LOCAL AIRFIELDS



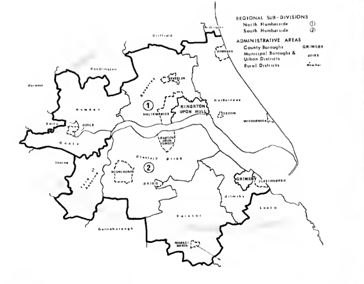
* The situation shown is that in 1968. Brough Airport will not be able to continue in operation for commercial services after about March 1970.

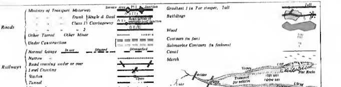
REGIONAL AIRPORTS

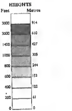


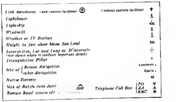
The situation shown is that in 1968.
Brough Airport will not be able to continue in operation for commercial services after about March 1970

52545 Od.137400 2/69 M.F.P





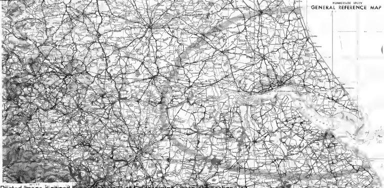



Civil Aerodrome (with custom facilities)
(without custom facilities)
Lighthouse
Lightship
Windmill
Wireless or TV Station
Height in feet above Mean Sea Level
156
Intersection, Lat and Long at 10' intervals (not shown where it confuses important detail)
Triangulation Pillar
Site of Roman Antiquities
other Antiquities
CANONIUM
Castle
Native Fortress
Site of Battle (with date)
1066
Roman Road (course of)
Telephone Call Box
PO
AA
RAC
T
A
R

The representation on this map of a road is no evidence of the existence of a right of way

The submarine contours are taken from the soundings of Admiralty surveys

Made and printed by the Director General *of the*
ORDNANCE SURVEY, SOUTHAMPTON, 1968
for the Ministry of Housing and Local Government



HUMBERSIDE STUDY

GENERAL REFERENCE MAP

1 SUMMARY OF THE REPORT

The problem

1.1. Our task has been to make a detailed economic and physical study of Humberside* and an assessment of the prospects for the planned movement of people into the Area on a large scale. The Study followed a national review of population trends and settlement patterns made in 1966. This showed that new areas suitable for large-scale development ought to be examined to help formulate a long-term national strategy for the location of population.

1.2. A large population increase—estimated at nearly 15 million—is expected to take place between now and the end of the century. These extra people will need houses, schools, shops and roads. There will also be new requirements that have nothing to do with population growth. Old houses should be replaced by better ones in more spacious surroundings, more roads built for the increasing number of cars, new style shopping centres constructed to meet changing patterns. All these developments must be planned so that they make the best possible contribution to national growth and better living standards. Many of them will, for good economic and social reasons, take place in or near present conurbations and other urban areas. But part of the new population could be housed in large new urban areas in relatively underpopulated parts of the country. Such a policy would have its problems, but also its advantages. In effect what we had to do was to assess the costs and benefits of this course in the particular circumstances of Humberside. (See Chapter 2.)

1.3. The size of the area studied and the planned inflow of people contemplated were greater than anything previously investigated in Britain. As growth would be continuous over a long period we had to look very far ahead in evaluating problems and opportunities, and thus to bear in mind the many changes which are likely in the next 30 years.

1.4. Planned overspill in the 1980s and 1990s is likely to be less than it is today but the voluntary movement of people, particularly the young, will probably be greater. If the development of Humberside is to be successful the Area must be sufficiently attractive to draw people and industry from other parts of the country. That is one reason why this Study differs from past studies of new town projects—where sources of manpower, and often of industry, were clearly defined.

1.5. Our enquiry followed three main lines. We assessed the Area's likely physical and economic development up to about 1981 in order to see what base it would provide for major growth. Secondly we examined the demands which a large-scale population build-up would create and the Area's physical and economic potential to meet them. Lastly we examined the costs and administrative aspects of such a major development.

1.6. Wherever possible we have tried to quantify the issues involved. For our calculations we have assumed that the extra population in Humberside by the end of the century should for study purposes be 300,000-750,000. We have assessed employment prospects and costs of development. But in many instances we found that while statistics helped they did not provide complete answers to our questions, and we have had to make the best judgments possible on available data.

The study of the Area

1.7. Humberside has considerable scope for physical expansion, but two main disadvantages at present: poor road connections with the rest of Britain, and many out-of-date houses; by the later 1970s these shortcomings will have been largely corrected. The water supply and the main sewerage system will only just be adequate for the Area's existing needs and would require substantial expansion for extra population. A major population inflow would therefore be more practical at the end, rather than at the beginning, of the 1970s.

1.8. Humberside has had a chequered economic history, with some periods of stagnation, but in recent years employment growth has exceeded the national average, particularly for men on South Humberside and in jobs for women in the service trades on both banks. Although unemployment is less than formerly, it remains above the national average, incomes are below the national average and the Area is losing more people than it attracts.

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* See Chapter 3 and General Reference Map following p. 142.

Economic growth is likely to continue, creating many more jobs by 1980, but during the same period the number of job-seekers will also grow as a result of the high local birthrate. This could mean a shortage of work for men in the 1970s on North Humberside—and possibly South Humberside—and the exodus would continue. This is not the ideal economic base for major population expansion. (See Chapter 10.)

The problems of planning growth

1.9. In a major population build-up in any area there are three main types of problem:

i the impact on the area's existing physical resources;

ii the provision of jobs adequate in number and quality for the increased population;

iii the social and administrative difficulties inherent in very rapid growth.

1.10. A big increase in population could lead to intense strain on physical resources. Adequate supplies of land might not be available. Car ownership by an increased population might mean crowded roads, while extra people going to work, shops and places of entertainment might cause serious congestion. Our studies show that Humberside would not be seriously affected in this way. There are ample reserves of developable land, although it is mostly of high agricultural quality. There need be no overcrowding of housing, communications or facilities. There are plenty of potential industrial sites, some of which could provide facilities for the bulk processing of raw materials brought in by ore carriers and large tankers; more land close to deep water could be provided by reclamation on the north bank of the estuary downriver from Hull. Several choices exist for accommodating the new arrivals—including developments near existing towns and the creation of new ones. New roads and infrastructure facilities could be planned at costs which are not excessive in relation to the population which would benefit. The absence of planning constraints would make it easier to introduce the new transport systems likely to be developed later this century. With careful planning and good design a most attractive city region could be created.

1.11. One major planning problem is the Humber estuary, which physically divides the Area, and we have examined with special care the question of estuary crossings and their costs. A 15 per cent first year return on the cost of constructing a Humber bridge would be obtained at some year between 1976 and 1986 even without major population growth. In addition the sooner a bridge is built the quicker wasteful expenditure in duplicating facilities on both banks will be avoided. If major planned expansion is to take place in the early 1980s there is a strong case for bringing forward the completion of a Humber bridge into the 1970s, preferably as early as 1976. A second crossing would be needed later, probably downstream from Hull. (See Chapter 4.)

1.12. A large-scale inflow of people into an area cannot be encouraged unless there are jobs for them. In any new development many jobs are created by the requirements of the new arrivals themselves—from the construction of houses to all sorts of personal services. The proportion of total employment provided in this way is steadily rising and could be two-thirds of the total by the end of the century. Many jobs must still be provided in manufacturing industry—both by expanding local concerns and by the arrival of companies from outside—and a highly skilled adaptable labour force would be required. In the particular circumstances of Humberside we have concluded that for major growth financial benefits would have to be offered to attract the necessary industry, and that such inducements might have to continue for a considerable time before the Area reached the point of self-sustaining growth. (See Chapter 6.)

1.13. Costs on Humberside have been compared with those at a theoretical 'minimum cost site', at which the costs of each individual item of development—drainage, roads, industrial inducements, etc.—would be as low as it could be for that item, at any site anywhere in Britain. The additional costs on Humberside, reckoned on this basis, might range, for a scheme accommodating 750,000 people, from £60 million to £100 million, which is between 3 per cent and 6 per cent of the total construction cost of about £2,000 million. Other actual sites for a new development would also involve additional costs, in respect of one or another individual element, but no data for comparison with Humberside is yet available. Different sites also offer varying advantages but these cannot be quantified. (See Chapter 6.)

1.14. The inflow of people into Humberside on the scale we investigated would have to be quicker than anything yet attempted in new towns. Problems would arise in organising construction, in matching the supply of jobs to the number of houses built, and in determining the powers of the planning and development agency. But these problems should not on balance be more difficult on Humberside than anywhere else. (See Chapter 7.)

Main conclusions

1.15. When we started work it seemed probable that for both national and local reasons an early decision whether or not to go ahead with major development on Humberside would be required. But developments already planned or projected elsewhere should now cater for the country's needs until about 1980 and, in view of the local circumstances (roads, housing and employment opportunities) there would be positive advantages in deferring the start of major development on Humberside until that time. This would also avoid development there having an adverse effect on the Development Areas. A decision by about 1972 would be soon enough for development to be under way by 1980.

1.16. Moreover if the final decision is not made until 1972 it could then be taken in the light of fresh information. During the next few years the effects of the recently intensified measures to assist the economy of the Development Areas should become much clearer, giving a far better indication of the likely effectiveness of measures to encourage industrial development on Humberside. By then decisions will have been taken on whether or not on national grounds a Maritime Industrial Development Area—MIDA—(as proposed by the National Ports Council*) should be created on the north Humber bank, and on the future of steel production at Scunthorpe. With this data, and other new information, the costs of development on Humberside could be more precisely estimated. The work now in hand on other possible ways of dealing with long-term population location problems will also have been completed, e.g. our own study of Severnside and the South East Joint Planning Study. Any decision on Humberside could then be taken with clearer knowledge of the costs and benefits of the main options.

1.17. Unless there are unexpected developments which indicate the need for earlier action the decision on whether or not to go ahead with major development on Humberside need not be taken until 1972. We set out in this Study the material we have collected which would be relevant to a decision at that time, but because important additional information will become available later we do not now make a final recommendation on what that decision should be.

1.18. But it is sufficiently likely that Humberside will be needed for major development in the 1980s to justify taking measures to preserve the Area's great potential value to the country, and to prepare it for the possibility of rapid development by that time. We therefore make recommendations for action needed during the next few years. The main ones are:

1. the authorities concerned should ensure that short-term planning decisions would not clash with longer term development,
2. rapid progress should be made with improving the roads and housing of the Area;
3. nothing should be done which would reduce economic growth prospects on either bank compared with other parts of the country;
4. in order to improve the Area's economy and underwrite its value for major development, construction of a Humber bridge should be completed by 1976. (See Chapter 8.)

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* *National Ports Council Annual Report, 1966*. HMSO, 1967.

2 THE NATURE OF THE PROBLEM

2.1. In the next few decades rapid growth in population, replacement of obsolete houses and other factors such as the growth in car ownership will cause a vast demand for urban land. Meeting this will entail substantial changes in Great Britain's urban settlement pattern. New houses, new roads, and other facilities will be needed on a large scale and will cost a great deal. But this demand will offer opportunities to locate new development where it will best contribute to national growth and improve living standards. Although much new urban growth will be concentrated around existing settlements some could be located in large new centres in the less heavily urbanised parts of the country. Humberside is one possible area for such a new centre.

Elements of change

2.2. The number of people in Great Britain has been growing steadily for many years and will probably continue to do so to the end of the century and beyond. The 1967-based estimate of total population in the year 2001 is 69 million, see Table 2a, which would be an increase of about 15 million in the 33-year period—over double the growth in the past 33 years. Although such estimates are subject to continuing amendment (the estimate for the year 2001 has been reduced substantially in the last two years) there is less uncertainty about the increase in the number of adults, so that the demand for houses by new families is undoubtedly going to be very great in the latter part of this century.

TABLE 2a

Forecast of total Great Britain population to 2001

'000,000

Year (1967-based forecast)	All ages	Adults 15+	Adults 20+
1967	53·9	41·0	37·2
1971	54·8	42·6	38·9
1991	59·3	43·9	39·2
1991	62·9	49·5	41·6
2001	69·9	50·4	44·9

Source: Government Actuary's Department.

2.3. New sites for houses will also be needed for other reasons. Many 19th century buildings have now to be replaced and those built in the early part of the present century will steadily become obsolete. With increasing wealth, lower housing densities will be expected and the demand for second homes and holiday accommodation will increase. The figures in Table 2b indicate the numbers which in one or more respects are below present-day standards, though they are not an exact measure of total replacement needs.

TABLE 2b

Housing England and Wales: future needs

Description	No. '000	Percentage of total number of dwellings
Dwellings built before 1919	6,029	39
Dwellings with a rateable value of less than £30	2,453	15
Dwellings lacking		
i water closet	2,919	18
ii fitted bath	2,106	13
iii wash basin	3,040	19
iv hot and cold water at three points	3,400	21
v one or more of the above	3,943	24
Dwellings to be replaced 1967-91 (current programme)	1,900	11

Sources: 1. Ministry of Housing and Local Government.
2. National House Survey, February 1967.

2.4. There will also be many more cars, which will mean a continuing high level of investment in new roads and heavy traffic pressure in the towns. The increase in vehicle numbers in recent years and the further increase expected are shown in Table 2c.

TABLE 2c

Licensed vehicles 1960–67 and projections to 1985 : Great Britain

'000,000

	Actual			Change 1967-70		Projections				Change 1960-67	
Type of vehicle	1960	1963	1967	No.	%	1970	1976	1980	1985	No.	%
Cars (including private vans)	5·5	7·4	10·3	4·8	+86	13·6 (13·4)	18·2 (17·5)	22·0 (20·6)	24·9 (22·9)	14·6 (12·6)	+142 (122)
Motor cycles, scooters, mopeds, etc.	1·9	1·8	1·4	–0·4	–22	1·6	1·5	1·3	1·3	–0·1	–7
All other vehicles	2·1	2·2	2·4	0·3	+15	2·6	2·9	3·1	3·3	0·9	+38
Total vehicles	9·4	11·4	14·1	4·7	+49	17·9 (17·7)	22·6 (21·8)	26·5 (25·1)	29·6 (27·5)	15·5 (13·4)	+109 (95)

Notes: 1. Figures do not always add to totals due to roundings.
2. Figures in brackets are alternative estimates assuming a moderately restrictive attitude to motoring.

Sources: 1. 'Actual' figures obtained from Ministry of Transport *Highway Statistics*. 1968.
2. Forecast figures extracted from *Roads and Road Construction*. November and December 1965. Carriers Publishing Co. Ltd., London, SW11.

Traffic pressure, the need to provide for different types of shop and changing shopping habits will necessitate radical reshaping of many town centres. New production techniques, demands for storage and car parking space seem likely to result in a large increase in the demand for industrial land. Leisure pursuits requiring extensive areas of land are becoming more popular with wider sections of the community and this trend seems likely to continue as real incomes rise.

Planning alternatives

2.5. Demands for additional space and pressures on existing urban structure will be greatest in the conurbations where conflicts between various requirements for land are already severe. But the conurbations and the city regions of which they form a part provide valuable facilities for shopping, leisure pursuits and the efficient operation of manufacturing and service industries on a large scale. The full use and inherent potential of these facilities have to be set against the costs of congestion and reconstruction. Other urban areas outside the conurbations present problems but most should be able to accommodate their own increasing population with varying difficulty, depending on their present structure, the need to preserve historic buildings and changes in local employment opportunities. Many could indeed expand further; the Government have already approved substantial expansion of a number.

2.6. Whether or not it is physically practical to build most of the new homes needed in or near existing urban areas, it is certainly not essential to do so. A large proportion of rehoused and newly formed families will, for economic and social reasons, be accommodated in those areas but many could be moved to new centres well away from the present main population concentrations. If such new centres are to make an appreciable contribution to housing needs they must be planned on a large scale. Several studies of possible locations for major new growth areas have already been or are being examined. Meanwhile the Government are making more general studies with which the assessment of these and other areas can be combined. All these studies will contribute to formulating a national strategy for population distribution.

The task

2.7. Other locations also needed examination and the Central Unit for Environmental Planning was given the task of investigating the problems, costs and benefits of a large-scale build-up of population on Humberside (and, later, of Severnside).

2.8. This task was unique in both scale and nature. The Area involved is the largest ever studied in Britain in terms of the possibilities for integrated large-scale development. Moreover to make a significant contribution to accommodating national population growth, expansion would have to be on a different scale to that so far contemplated in new and expanded towns. The total population at the end of 1967 in all new towns and town expansion schemes in Great Britain undertaken since 1945 amounted to 750,000. Individual schemes have become greater in scope and, in the case of Milton Keynes and Ipswich, plans for an ultimate population of 250,000 people are being prepared. We were however called upon to study an even larger type of project. Growth would clearly have to be spread over the whole of the period to the end of the century, so that economic, social and technological trends over a similar time-scale had as far as possible to be included in our work although the national background over such a long period must be largely conjectural.

Population objectives on Humberside

2.9. The Area already has a large and growing population. The population growth on Humberside and Great Britain in 1951-66 is shown in Table 2d.

2.10. The percentage increase in total population in the Area from 1951-66 was slightly greater than the national increase, 10·3 per cant as against 9·6 per cent, but it was much greater than the Yorkshire and Humberside Economic Planning Region as a whole, where the increase was only 5·4 per cent. This was largely due to a high birthrate giving a natural growth in the Area well above the average for Great Britain. Also, although people have been leaving North Humberside in large numbers for many years, this has been partially offset by the inward movement into South Humberside. These net

TABLE 2d

Civilian population changes 1951–66:
Humberside and Great Britain (mid-year to mid-year)

	Population at beginning of period	Total Change		By births and deaths		Armed forces rundown		Balance mainly net migration		Population at end of period
	'000	'000	%	'000	%	'000	%	'000	%	'000
North Humberside										
1951-66	439·0	30·0	6·9	45·6	10·4	3·9	0·9	–19·4	–4·4	469·9
1851-56	439·0	7·9	1·9	14·1	3·2	0·7	0·16	–7·0	–1·6	445·9
1958-61	446·8	9·4	2·1	14·6	3·3	2·6	0·59	–7·9	–1·7	456·2
1861-66	456·2	12·7	2·7	16·9	3·7	0·5	0·11	–4·7	–1·0	469·9
South Humberside										
1951-66	260·5	42·3	16·2	32·9	12·6	2·2	0·9	7·3	2·9	302·9
1951-56	250·5	8·5	3·3	9·0	3·5	0·4	0·15	–0·9	–0·9	289·0
1956-61	269·0	17·3	6·4	10·4	3·9	1·5	0·56	5·4	2·0	286·3
1961-66	296·3	16·5	5·9	13·4	4·7	0·3	0·10	2·9	1·0	302·9
Total Humberside										
1951-88	689·5	72·3	10·3	79·4	11·2	8·0	0·9	–12·1	–1·7	771·7
1851-56	699·5	16·3	2·3	23·1	3·3	1·1	0·16	–7·9	–1·1	715·9
1956-61	715·8	26·7	3·7	25·0	3·5	4·1	0·57	–2·4	–0·3	742·5
1961-66	742·5	29·2	3·8	30·3	4·1	0·9	0·11	–1·8	–0·3	771·7
Great Britain										
1951-66	49,333·3	4,863·8	9·9	3,899·5	8·3	416·9	0·9	237·5	0·5	52,997·1
1851-56	49,333·3	801·0	1·8	1,013·4	2·1	74·3	0·2	–198·7	–0·4	49,234·3
1956-61	49,234·3	1,912·2	3·7	1,300·2	2·6	281·9	0·6	230·2	0·5	51,046·5
1951-66	51,046·5	1,940·6	3·8	1,695·9	3·3	60·7	0·1	194·0	0·4	52,897·1

Source: General Register Office.

migration flows have been declining with fewer leaving North Humberside or arriving in South Humberside in 1961-66 than in the previous five years.

2.11. A range of possible population targets is essential to a study of this nature. Given the object of the Study the targets had to be high, but the existing population of Humberside, the problems of the Area and its potentialities had to be considered in fixing them. An extra 300,000 people seemed about the right level for the 'minimum' schema, on the grounds that a smaller intake would not provide a major contribution to the national problem. At the other extreme we assumed that 35,000 people were the practical maximum annual intake in an area of this size, which would give about 720,000 extra people in the Area by the end of the century, over and above the natural increase of those already there.

2.12. We also had to make assumptions about the division of the intake of population between the two banks of the Humber. There is no reason to favour one bank against the other: the main base of ordinary manufacturing industry and the one existing city are on the north bank but the south bank has important raw material processing industries and substantial areas for industry and population. It should be easier to deal with a very rapid intake of population by dividing the inflow between the two sides. We therefore assumed that the new arrivals would be divided more or less equally between the two banks at all stages. In further planning for the Area it would be desirable to examine the possibility of varying the phasing of growth on each bank to see whether this made any appreciable difference to planning problems and capital and running costs.

Timing of growth

2.13. We began by examining the proposition that development on Humberside should begin as soon as possible. Since our report will have to be followed by consultation with the authorities concerned, and the subsequent procedures and preparation of a master plan would take several years, the intake of population could start in 1975, but not before. However it became clear during our work that there were arguments against contemplating a major build-up in the Area before the 1980s. At the national level plans are being implemented or are under consideration for a large number of new towns and town expansions, and these with development and expansion of existing settlements should cope with the population growth of the country during the 1970s. Constraints on the growth of new settlements are likely to be particularly severe in the 1970s, because the natural growth of the working population will be relatively small during that time. In addition the requirements for new industry, of the Development Areas and other parts of the country, to make up for the decline in employment in coalmining and other older industries will still be strong. Major developments in any part of the country should therefore be easier to mount if deferred until the 1980s.

2.14. The particular circumstances of Humberside reinforce the arguments against early development. Economic expansion of the Area will be much easier to stimulate when the major improvements in the roads joining it to the rest of the country have been completed, which will not be until the later part of the 1970s. Moreover major development would need substantial house-building resources, but during the 1970s resources must first be devoted in the Area to dealing with the problem of replacing older houses (see Chapter 9) before turning to large-scale new development.

2.15. There is therefore no case for deferring developments already planned elsewhere in order to bring the beginning of development on Humberside earlier than the late 1970s. However some limited development towards the end of the 1970s would be helpful if rapid rates of growth were required in the 1980s.

Resulting population levels

2.16. The total increase in population by the year 2001 would be determined by the total inflow, its rate of arrival, the natural increase of the inflow and the natural increase of the indigenous population i.e. those already living in the Area before growth starts. The substantial difference between the age structure of migrants and that of the population of the country as a whole is shown in Figure 1. In Chapter 7 we examine the possibility of bringing the age structure of migrants to Humberside more in line with the national average, but in view of the difficulties involved we have calculated population growth

TABLE 2e

Humberside: intake of population 1976–2001

'000

	MINIMUM SCHEME		MAXIMUM SCHEME	
Period	Annual rate over quinquennium	Cumulative from 1976	Annual rate over quinquennium	Cumulative from 1976
1978 - 81	1·25	5·25	2·5	12·5
1981 - 86	3·75	25·0	12·5	75·0
1986 - 91	7·5	62·5	27·5	212·5
1991 - 96	15·0	137·5	35·0	387·5
1996 - 2001	20·0	237·5	35·0	562·5

TABLE 2f

Humberside: total population projections with and without planned migration

'000

	1968	1871	1976	1881	1986	1991	1996	2001
Indigenous population growth	0	27	28	30	32	37	43	44
Total Indigenous population	772	799	827	857	869	925	969	1,013
Minimum scheme Intake	0	0	0	6	25	53	138	238
Natural growth of intake	0	0	0	2	7	15	35	86
Total population	772	789	827	865	921	1,003	1,141	1,316
Maximum scheme Intake	0	0	0	13	75	213	388	563
Natural growth of intake	0	0	0	4	21	54	88	181
Total population	772	799	827	873	885	1,192	1,443	1,736

Note: Figures do not always add to totals due to rounding.
Source: General Register Office.

assuming a structure broadly similar to those of new towns. There are many ways of reaching the final figures for the extra population indicated in para. 2.11., allowing for the above factors. The one we chose is given in Table 2e. (The total under the maximum scheme of the intake and the natural growth of the intake is 723,300, but this has been rounded to 750,000 for most purposes.) The effect of these annual rates together with the natural increase of the local population are given in Table 2f and shown in Figure 2. The total population in the Area by the year 2001 would be about, 1,750,000 in the maximum scheme and 1,300,000 in the minimum. The annual rates of growth in the 1990s are such that the momentum of growth would continue into the 21st century drawing in more people from the rest of the country.

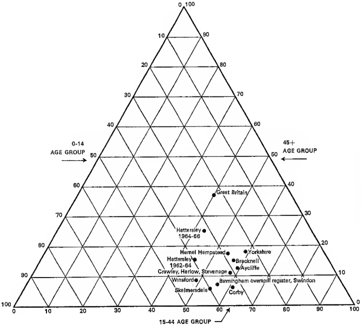
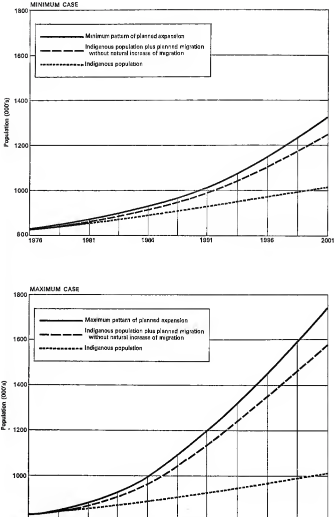


Figure 1 **Great Britain resident and New Town migrant population distribution**

The graph compares a broad age group distribution for Great Britain in 1966 with the migrant patterns experienced by certain of the New Towns and with migration into Yorkshire during the 1960-61 census. The graph is read by taking the line to the right of the vertical from the scale points on each axis; for example, Gt. Britain exhibits the following broad age group distribution: 0-14, (23%); 15-44, (40%): 45+, (37%).

Figure 2 Humberside cumulative population growth



Sources of population and industry

2.17. A prime consideration has been the question of where the sources of population and new employment were likely to be found on the scale and in the period being examined. Secondly by what means would movements into Humberside have to be engineered.

2.18. Since the second world war planned overspill schemes using the New Towns Acts and the Town Development Acts have been a prominent feature of officially induced population expansion. They have helped to solve the housing land shortages of the conurbations and employment has come mainly from the same areas. The most important achievements have been the creation of the new and expanded towns around London.

2.19. The concept of planned overspill was evolved initially to meet the critical post-war problems of housing and of industrial rehabilitation and expansion. As the housing situation has improved and as job mobility has become easier and more generally accepted, population movement through the medium of planned schemes, which has never accounted for more than a fraction of total movement, has become relatively less significant. It is likely that except for movement from areas of acute housing and housing land shortage the bulk of migration in the future will be spontaneous. This means that growth must largely derive from an area's job prospects and from its attractions as a place in which to live. On this argument, once growth had got under way on Humberside, it could be expected that the Area would draw population from all parts of the country though its pull on the nearest large populous areas would probably be more marked than on more distant parts.

2.20. The outcome would depend on the relative strength of the attractions which could be provided on Humberside compared with those elsewhere. There may well be some parts of the country which, because of problems of industrial decline will be the subject of inducements to movement during any period of Humberside expansion. On present distribution of industry policies, it might be expected that a Humberside expansion would be a recipient of industry steered mainly from the South East and the West Midlands and would be competing with the Development Areas. But by the 1980s the geographical incidence of employment problems could have altered as a result both of present government measures and of technological and economic changes, so that sources of new industry might be different. One factor will be the expected increase in the proportion of all employment which will be provided by the service industries: this will strengthen the expansionist characteristics of existing population centres. On the other hand once a new area is sufficiently successful the growth of service employment will make it easier for it to become self-sustaining.

2.21. Whatever may be the main sources of population and employment over the whole period of expansion there will certainly have to be a substantial 'pump-priming' operation. Present experience suggests that planned overspill schemes must be regarded as one of the most promising ways of achieving this. But a major difficulty could be the distance between Humberside and any of the conurbations from which such schemes might be promoted; so far attempts to arrange very long-distance combined movements of population and employment have created problems.

2.22. The West Riding conurbation, the major urban area closest to Humberside, has land for housing both within and on its borders. It is not likely to provide much industry for outward movement: indeed parts of the area are suffering from a relatively slow rate of industrial growth and may themselves need an injection of new types of employment from outside. At present there are only three likely major sources of planned overspill. The first, the West Midlands, might become a source of population but at present is facing difficulties in providing enough mobile industry to man its own relatively local overspill schemes. Secondly there is the South East. This was for years the only area operating any major schemes and has also been one of the main sources of industry for Development Areas. It remains to be seen whether the South East Joint Planning Study, now in hand, will indicate any need for substantial movements in the 1980s to locations as far away as Humberside. Thirdly there could be new possibilities from the North West, a region which has not before been thought of in terms of any outward movement. Parts of this area are now responding well to Development Area treatment and it is conceivable that by the 1980s land shortages in the Merseyside and West Lancashire conurbation areas might become so serious that the cross-Pennine motorway and railway could encourage movement to Humberside.

2.23. Nevertheless at present there is difficulty in identifying the planned overspill arrangements which might be one way to initiate a major population and employment build-up on Humberside in the 1980s and the answer will eventually have to be found outside the Study Area. The main issues we had to consider were whether Humberside has the physical potential to provide the good living conditions and the economic potential to produce the well-paid jobs which, together, would attract large numbers of people, either through voluntary or planned movement. These basic issues are examined in Chapters 4 and 5.

3 THE STUDY AREA

Location and definition

3.1. Humberside was thought worth detailed study as a potential location for a major new growth area for three main reasons. First it is well clear of the country's main belt of existing industrial centres—though not so far away as to be at a serious economic disadvantage. (From Hull as the crow flies Leeds is only 50 miles distant, Manchester 80 and Birmingham 110 miles.) Second it has substantial areas of thinly populated land including land well suited to industrial development. Third its deep-water estuary and ports are particularly important to the country's growing European trade. Map 1 illustrates Humberside's general position in relation to the rest of the country and the routes to the Continent.

3.2. The General Reference Map (following p. 142), shows the main characteristics of the Area. An important element both in its geography and its economy is the wide Humber estuary with its deep-water channel. This slices the Area in two, and at Hull is nearly two miles across. The only crossing in its length of 44 miles is the ferry between Hull and New Holland. On the other hand its deep water has been the main factor in the growth of ports at Hull and Immingham, without which the economic

TABLE 3a

Humberside: local authorities, civilian population

Area	'000		%	
Hull area	347·8		45·1	
Hull CB		298·0		38·6
Haltemprice UD		48·8		8·4
Rest of North Humberside	121·2		15·7	
Beverley MB		17·0		2·2
Goole MB		18·8		2·4
Hornsea UD		8·1		0·8
Withernsea UD		5·0		0·6
Hedon MB		2·5		0·3
Holderness RD		23·1		3·0
Beverley RD		27·4		3·5
Goole RD		9·0		1·2
Howden RD		12·4		1·6
North Humberside	468·9		60·8	
Grimsby area	152·9		19·8	
Grimsby CB		85·0		12·3
Cleethorpes MB		33·8		4·4
Grimsby RD		24·1		3·1
Scunthorpe MB	71·0		9·2	
Rest of South Humberside	76·9		10·2	
Barton-upon-Humber UD		6·6		0·9
Brigg UD		5·1		0·7
Caistor RD		13·7		1·8
Glenford Brigg RD		38·0		5·1
Isle of Axholme RD		14·5		1·9
South Humberside	302·8		39·2	
Humberside—Total	771·7		100·0	

Source: **General Register Office.**

activities in the Area might have been limited to agriculture and to steel production at Scunthorpe.

3.3. Because the Area is isolated, with no significant journeys to work between it and adjoining areas, it has been unnecessary to define precise boundaries; the three main towns of Kingston upon Hull—Haltemprice, Grimsby—Cleethorpes, and Scunthorpe and the areas centering on them have been taken as the essential elements. To the west key points in the existing and planned communications system have been included: the Boothferry, Goole and proposed Hook crossings of the Ouse, the road and rail bridge over the Trent at Keadby, and the road and rail connections at Thorne. Thus the Area extends about 50 miles east to west and about 40 miles north to south.

3.4. For certain statistical purposes it has been convenient to use the North Humberside and South Humberside statistical sub-divisions of the Yorkshire and Humberside Economic Planning Region as co-extensive with the Study Area. These cover a total area of about 730,000 acres (1,140 square miles) and have a population of about 770,000. Their composition, in terms of local authority areas, together with the existing population distribution, is given in Table 3a. These areas coincide approximately with the Department of Employment and Productivity local office groups from which most of the employment data has been compiled, namely:

North Humberside: Hull, Hessle, Beverley and Goole

South Humberside: Grimsby, Scunthorpe and Barton-upon-Humber.

In this Chapter we describe the main characteristics. A full physical assessment of Humberside is given in Chapter 9 and an economic assessment in Chapter 10.

Physical features

Population distribution

3.5. *Kingston upon Hull* on the north bank of the estuary at the mouth of the River Hull has been a major port at least since the 13th century. At that time it was a smaller town than the mediaeval port, cloth-making and religious centre of *Beverley*, which lies further north on the river. Hull's rapid growth in population followed the construction of the railways and the docks in the early 19th century. Between 1820 and 1860 the population increased from 40,000 to 100,000 and with better systems for land drainage the city spread unimpeded over the low valley floor. It is only comparatively recently that its continued extensions have begun to embrace former separate communities on the surrounding higher land. The urban areas of Hull and Haltemprice now house nearly 350,000 people. Much of Hull's centre has been rebuilt following severe bomb damage during the second world war, so that it is now well equipped with modern shopping, entertainment and other facilities. Hull also has the one university in the Area.

3.6. On the south bank *Grimsby*, with the adjoining residential and resort town of Cleethorpes, has a population of nearly 130,000. Grimsby arose from a Scandinavian settlement on Freshney Haven, but at the beginning of the 19th century was still little more than a large village. It was transformed by the coming of the railway and the expansion of the fishing industry which has remained its principal port activity. A scheme is in hand for major reorganisation of its central areas.

3.7. At *Immingham* a new deep-water railway dock was opened in 1912 but its impact has only been pronounced since the second world war. In response to port and industrial development arising from the availability of deep water Immingham has now developed into a small town with a new centre.

3.8. The railways also played a large part in the development of seaside resorts at *Cleethorpes, Hornsea* and *Withernsea*, which were brought in easy reach of the industrial towns of Yorkshire.

3.9. The small port of *Goole* on the River Ouse is a transhipment point for the inland waterways. Its population approaches 20,000.

3.10. Apart from the ports the only large town in the Area is *Scunthorpe* which has a population of over 70,000. It is astride the main road and rail approaches to the south bank and immediately east of the lower Trent which is negotiable by small sea-going ships but has few direct economic links with the rest of the Area. Scunthorpe's development has been almost entirely due to the steel industry based on local ore. The first ironworks and the railway were opened in 1864. Following this the town developed in a generally southward direction and took its present form after the first world war.

3.11. With the concentration of new population in the three big towns, improved communications and the decline in the agriculturally based population, some of the small towns, such as Barton-upon-Humber, Hedon, Caistor, Epworth and Crowle became less important as local centres. Since 1945 movement out of the larger urban areas has begun to give the villages a new dormitory role. So far house-building on any significant scale has been confined to places within a few miles of Hull, Grimsby and Scunthorpe, and the scale of growth in the surrounding small towns and villages has not radically altered the long-established rural settlement pattern, much of which was strongly aligned north-south, following the natural topographical graining. Wide areas of Humberside remain very thinly populated, and on the dry chalk Wolds roughly above 200 feet there are still only widely dispersed hamlets and farmsteads.

Development plans

3.12. There are approved statutory Town Maps for all the main built-up areas under the Town and Country Planning Acts though some are overdue for review. (See para 9.65.) These statutory plans are supported by various local development proposals and planning permissions and commitments covering other proposed areas, such as those included within the recently agreed boundary extensions of Kingston upon Hull. Taken all together they give an indication of the amount of agreed land officially available for development.

3.13. Undeveloped areas with planning commitments for possible industrial or commercial uses amount to nearly 6,000 acres on South Humberside and 2,000 acres on North Humberside. The largest commitments are on the south Humber bank from Great Coates northwards. (See para. 9.85.)

3.14. On North Humberside there appears to be enough agreed residential building land, including about 3,000 acres at present undeveloped, to deal with current clearance schemes and to provide a net addition to housing stock of about 24,000 dwellings. If this were all taken up it could probably cater for slightly more than the projected growth of the indigenous population. There are allocations of roughly the same order for South Humberside with agreed sites for about 27,000 dwellings which could accommodate the projected 1981 population increase together with immigration of about 25,000 people.

3.15. However the Area's rapid growth in the 19th century is now shown by the large numbers of old dwellings which still survive from this period, in spite of losses from bombing and vigorous clearance and rebuilding since 1945. If all the houses with a rateable value below £30 are to be replaced by 1981 (an objective proposed by the Yorkshire and Humberside Economic Planning Council) the rate of replacement will have to be increased significantly above present levels in the 1970s, and total house-building excluding any requirements for an inward migration will have to be 8,000 a year in the latter part of the period as against about 5,000 at present. This would call for further allocations of housing land mainly to meet Hull's needs. A housing replacement programme will be needed for the rest of the century to deal with housing as it becomes sub-standard. (See para. 9.70.)

Communications

3.16. The estuaries of the Humber, the Thames, the Mersey and the Severn have a common hinterland in the industrial Midlands. Between them their ports handle most of Britain's foreign trade.

3.17. The Humber estuary is one of the few in the country offering a combination of deep water and land suitable for industrial development. Its advantages are most marked in respect of the North Sea routes to northern Europe. The shortest and busiest crossings to the Continent are from the Thames and the smaller Channel and Haven Ports; but a second important set of routes focuses on the Humber (see Map 1). The shortest land-sea routes from the Midlands and South Wales to Scandinavia or from North West England to the Low Countries are through the Humber ports. Distances from the Humber across the North Sea permit a 24-hour round trip on services to Rotterdam. A combination of regular, scheduled sailings of roll-on/roll-off or unit load ships with liner trains or specialised road vehicles offers fast and convenient links to northern and western Europe from the Midlands, the North West, Wales and Ireland.

3.18. Although the location of the Humber estuary in relation to Europe is becoming more important and good rail communications have long been available, the approach roads to both the north and south banks have yet to benefit from major post-war improvements. But the Ministry of Transport plans radical improvement of the trunk road system in the 1970s and there are locally sponsored proposals for building a road-bridge over the estuary.

Natural features and resources

3.19. Beyond its urban areas Humberside consists of wide areas of well-farmed typical English lowland countryside largely lacking wild country. The scenery reflects the geological structure (see Map 2): the strata dip gently eastwards so that the slightly harder formations—mainly limestone and chalk—give rise to north-south ridges with westward facing scarps.

3.20. The chalk outcrop produces the main relief feature—the Wolds. The Yorkshire Wolds west of Hull rise to over 500 feet; the Lincolnshire Wolds are little over 300 feet along their western crest, but also reach over 500 feet south of Caistor. To the east the lower slopes of the Wolds are overlain by glacial clays, sands and gravels. East of the River Hull they form the low, hummocky surface of Holderness extending to a coast of sandy, but generally narrow beaches backed by low and rapidly eroding clay cliffs. These glacial deposits are in turn overlain by the recent alluvial deposits of the Hull valley, and the marshlands and reclaimed warplands along both sides of the estuary. These flat waterside areas provide extensive sites for major industrial plants. To the west of the chalk and limestone ridges, the Area incorporates part of the flat, low-lying vales of York and Trent which separate Humberside from the urban areas of the West Riding and South Yorkshire.

3.21. The Yorkshire Ouse and Trent River systems, which drain an area of over 9,000 square miles, flow into the Humber. The principal rivers—the Hull, Derwent, Ouse, Aire, Don and Trent—are all tidal throughout the Study Area. Large areas adjoining these and the estuary are below high-tide levels so that practically all the local land drainage from within Humberside has to be through tidal doors into embanked watercourses. Most of the rainfall on the Wolds is absorbed into the chalk, or by vegetation, so that over large areas there are few natural streams.

3.22. Climatically Humberside has much the same characteristics of sunshine and temperature as a belt of central England running through the East Midlands towards Wiltshire. Within Humberside the amount of sunshine tends to increase towards the south and east. Hull has a poorer record than the surrounding rural areas. Total rainfall is low, ranging from under 23 inches a year around Cleethorpes up to 30 inches on the northern parts of the Wolds. Although the incidence of gale force winds is below average, the average wind velocity is high, particularly on the coasts and the crests of the Wolds: on the east coast only the mouths of the Tay and the Forth, and the Northumberland coast, are as windy. The prevailing winds are westerly, but easterly winds can persist in the late winter and early spring. Visibility on Humberside is generally good, though rather less so near the estuary itself. Fog is infrequent within about eight miles of the coast and in those parts of the Wolds which lie some 150 feet and over above sea level; the Holderness coast is much less susceptible to sea mist than areas further north. The incidence of fog increases inland in the valley bottoms of the Rivers Hull and Ancholme and in the Trent valley.

3.23. There are extensive and continuous areas of mostly arable farmland. Nearly half the agricultural land is grade I or II on the Ministry of Agriculture classification system (see Map 3 and para. 9.16), most of the rest being grade III. Humberside has an agricultural industry of exceptional importance characterised by large, well-equipped and efficient farms.

3.24. The most important mineral deposits are the ironstones that have provided the basis for Scunthorpe's steel industry. Chalk and clay are worked to supply three cement works and a fourth uses limestone. The chalk is also used for agriculture and whiting, and the clay for brick and tile production. There are valuable silica sands which are mainly sold outside the Area for glass-making and foundry purposes. The West Sole natural gas field is 45 miles east of Spurn Head.

3.25. Most of the Area's water supplies have been drawn from underground sources, mainly in the chalk. These have been a factor in establishing several large water-using industries on the south Humber bank: they are now almost fully exploited and increased yields are having to come from large-scale surface-water schemes which are generally more expensive.

The Area's economy

3.26. North and south of the Area lie the almost entirely rural mid-Yorkshire and South Lindsey sub-divisions of the Yorkshire and Humberside Economic Planning Region. Though Humberside is economically more diverse and developed than these neighbouring sub-regions it still contrasts strongly with the urban industrial complexes to the west. Even the presence of large ports at Hull and Grimsby and the steel town of Scunthorpe does not obscure the essentially agricultural character of large parts of the Area.

3.27. The 19th century was a period of dramatic expansion for Hull and Grimsby. Hull, favourably sited close to the deep-water channel of the Humber and near the growing populations of the West Riding and Lancashire, developed as a general cargo port and as an industrial city, processing some of the raw materials and foodstuffs imported through its docks. Grimsby was largely restricted by its shallow water to the development of the fish trade. Meanwhile the inland port of Goole, further upstream, also developed rapidly as a centre of the coastal and export trade in coal from the Yorkshire and Midlands pits.

3.28. The 1814-18 war brought an end to this period of rapid growth. This meant among other things that the potentialities of the new port of Immingham, opened shortly before the first world war as a deep-water extension of Grimsby Docks, began to be realised only in recent years. Between the wars perhaps the most significant development in the Area was the spectacular growth of Scunthorpe as a new steel town exploiting local iron ore. The only other growth in this period was in some food-processing and manufacturing industries in Hull. Migration from the Area continued throughout the 1930s. From 1931 to 1939 the population of Hull rose by only 6,000 to 320,000, and in the whole Area unemployment was above the national average.

3.29. Very heavy damage to the Humberside Area during the 1939-45 war seriously disrupted employment, especially in Hull where bombing destroyed half the central shopping area, 3 million square feet of factory space and over 3,000 houses. Reconstruction was delayed by shortages until the early 1950s, and employment was further reduced by the after-effects of wartime evacuation. Since then employment has grown appreciably in the Area, both absolutely and in terms of the Area's share of national employment. The growth has been particularly marked in manufacturing on the south bank and in employment of women in the service trades on both banks. The population has also grown rapidly, owing to the high birthrate, and there has been net outward migration from North Humberside not wholly balanced by inward movement on South Humberside (see Table 2d). Income levels in the Area are below the regional and national average—no doubt a factor in the outward movement.

3.30. An indication of the post-war growth of industry is provided by the amount of investment in new industrial buildings and extensions. In 1945-66, approximately 21 million square feet of floor space was approved for manufacturing industries on Humberside. In relation to employment the rate of industrial building on North Humberside in 1953-66 was about equal to the national average, but on South Humberside the building rate was more than double the national average.

3.31. This growth cannot be attributed to anything positively favourable to the Area in the Government's distribution of industry policy. Humberside has never been regarded as either overheated or congested, and it has never been given Development District or Development Area status. Nevertheless applications for industrial development certificates on Humberside have never been treated as rigorously as in the South East or the West Midlands and for a few months in 1959-60 schemes in the Hull district were eligible for assistance under the Distribution of Industry (Industrial Finance) Act of 1958.

3.32. Hull is the country's third largest port by value of trade. It has traditionally handled a much larger tonnage of imported commodities than of exported manufactured goods, and it is those imported foodstuffs and raw materials that still form the foundations for the city's industries. Chemicals, food and drink, and timber products are prominent groups. In addition over a third of Britain's imports of wool enter Hull for the textile industries in the West Riding of Yorkshire.

3.33. The 1939-45 war had a serious impact on Hull's economy, the heavy damage to industrial and commercial property creating serious underemployment. There was no general improvement in subsequent years, and in 1959 Hull suffered peak unemployment of 3·4 per cent. Since then unemployment has moved down much closer to the national average level, although the relative position worsened again in 1968. Since 1959 reductions in the numbers employed in agriculture, fishing, shipbuilding and transport have been more than offset by increases in distribution, chemical industries, timber and timber-using industries, caravan production, engineering and the production of building materials. The total number of employees has grown substantially, but male employment has merely retained its percentage share of the national total of employment for men. Labour-saving techniques in the ports and in transport have brought increases in traffic without much increase in employment. Service employment has grown particularly strongly both absolutely and in relation to national growth, the main factor being the rapid growth in female employment in distribution and public services.

3.34. Apart from the general buoyancy of the national economy during this period the factors chiefly responsible for the increase in employment on North Humberside seem to have been the notable successes of some local firms, heavy capital investment in the docks, the opening of new roll-on/roll-off ferry services to the Continent and the rapid growth in demand for services of all kinds. The large house-building programme has also helped to maintain a high level of activity in the construction industry.

3.35. The fall in total employment in 1967 (4 per cent) was more marked than the national decline and suggests that North Humberside still reacts more strongly than Great Britain as a whole to checks in national economic growth.

3.36. The most striking feature of manufacturing industry in South Humberside is metal-manufacture. During the past 50 years Scunthorpe has been by far the fastest-expanding town and its growth has been based on the development of the steel industry in three integrated iron and steel plants, which provided two-fifths of the jobs there. But the peak was reached in 1965, and in future rises in steel output are likely to be achieved with a static or even a declining labour force. Other industries employing men have been established, but these are still associated with steel; for example the production of steel castings and the processing of basic slag. The surplus of female labour has attracted knitwear and other firms from the Midlands. Large numbers of workers travel into Scunthorpe, particularly from the Brigg area.

3.37. The post-war development of industry, mainly chemical and fertiliser firms along the south bank of the Humber immediately upstream from Grimsby, has been spectacular. This stretch of country offered outstanding advantages. The port and the local authorities adopted progressive planning policies, land was cheap and flat, and effluent could be discharged direct into the estuary. Water supplies were ample, although this is no longer so. The docks at Immingham, accommodating the larger type of ocean-going vessels, were available for importing or exporting bulk materials, and there was deep water in the estuary suitable for large tankers.

3.38. Six post-war processing plants established on the Humber bank between Immingham Docks and Grimsby now employ more than a quarter of those working in manufacturing industry in the Grimsby Employment Exchange area. Even this is not the full measure of the industrial change in this area—the rapid expansion in the quick frozen food industry is also of great importance and alongside the cold stores new quick freezing factories have been built by most of the major firms in the trade, British and Scandinavian. They handle not only locally landed fish but also the products of the Lincolnshire countryside. The town of Grimsby is therefore now not so much a fishing port as a major food-processing centre.

3.39. A notable feature of South Humberside is the large amount of recent industrial building, and many of the factories constructed in the 1950s have since been extended. On the other hand employment growth along the south Humber bank during recent years has been lower than in the 1950s.

3.40. As in North Humberside the rapid growth in service employment has been mainly in jobs for women, although the female activity rate is still well below the national average. The overall growth in jobs in the area has been sufficiently rapid to attract people from elsewhere, although the inward flow of migrants has slowed down recently.

4 PLANNED GROWTH: PHYSICAL POTENTIAL

4.1. Humberside has considerable physical resources available for major expansion. But there are also shortcomings in its existing infrastructure which raise doubts about its ability even to cater for the needs of its own growing population, though there are plans for substantial improvements. On the housing front the replacement programmes under way will reduce the problem of sub-standard housing by 1991. But the total number of dwellings that may have to be replaced by the end of the century is about 100,000 with two-thirds on the north bank. Given even an accelerated programme in the 1970s part of the renewal would have to be dealt with simultaneously with building for increases of local population and for any intake of new population in the 1980s. Population expansion would, however, make new resources available; with the opening up of new areas there would be greater flexibility in rehousing, and clearance schemes would afford opportunities for restructuring the older urban areas to meet the strains of a larger population. The schemes in the Ministry of Transport's road programme and preparation pools should radically improve the road system so that by the latter part of the 1970s the roads would have some spare capacity relative to many parts of the country. On present plans the water supplies and the sewerage systems would have little spare capacity by the end of the 1970s (see Chapter 9).

4.2. On the credit side the central area facilities of Hull, Grimsby and Scunthorpe have been or are being remodelled. These, especially in Hull, should be capable of expansion without great cost to meet substantial increases in demand arising from new population. The social services in the Area also have an adequate structure on which to build, including a fine new hospital and a university in Hull.

4.3. Thus the available capacities and current plans in the Area could only deal with the start of major expansion. We have, however, to consider the problems arising from a large population intake, which must involve preparing plans radically different from those which local planning authorities would normally make.

4.4. We have considered the factors that might limit development either totally or in respect of particular parts of the Area and attempted to deduce which parts would be available or particularly suitable for large-scale industrial or urban use. Using a selection from the areas thus identified we have examined certain hypothetical outline land-use plans in order to investigate the range and relative advantages of some development possibilities and to highlight possible difficulties, e.g. congestion. We have also considered communication problems, including the question of a Humber bridge. It was not however part of our function to formulate a definitive physical plan for the Area and we have done no more than identify certain attractive possibilities.

Land for industrial development

4.5. Over 4,500 acres of land on Humberside were in industrial use in 1966 (see para. 9.81). A further 750 acres were being developed and, in addition, almost 8,000 acres were subject to some forms of planning commitment. A high proportion of those developing and potential areas was on the south Humber bank. Major development would therefore start with a substantial stock of industrial land. Many of the new sites for light industries, research establishments, commercial uses and the service trades would be incorporated within the new urban areas. We started by considering more closely the question of industrial land, because on Humberside there are extensive sites especially suitable for large-scale industrial enterprises whose location would both be a positive element in the planning of the Area and impose constraints on the selection of residential sites. Their approximate location is illustrated in Map 4.

Estuarial sites

4.6. There are major areas of flat land alongside the estuary which front, or have possibilities for access to, deep water. They are attractive to industries using large quantities of imported raw materials which can be brought in cheaply by large vessels and to industries producing large volumes of effluent.

4.7. On the south bank the deep water is close inshore between North Killingholme Haven and Immingham. The available land there will be limited once existing and planned developments have been completed (see para. 9.88). However in the adjoining flat area—at Goxhill, North Killingholme Airfield and Stallingborough—there are over 6,000 acres which, although they have no direct access to deep water, could be used by industries drawing supplies, e.g. by pipeline, from Immingham Docks or over deep-water jetties. These areas could also provide opportunities for developing by-product plants linked to existing refineries and chemical works. There are also plans to pipe oil ashore from a floating deep-water terminal off Tetney Haven and there is flat land at Tetney for associated industrial development.

4.8. On the north bank there is deep water off Hawkin's Point which has not so far attracted development. The main navigational channel approaches the shore only between Thorngumbald Clough and Hull. There are tank storage facilities and chemical plant at Saltend where there is land for additional industrial development.

4.9. The deepest water is in Hawke Roads; it is believed that this part of the estuary could be artificially improved to take 200,000 deadweight tonnage vessels (see para. 9.11). In this context a land-reclamation scheme for Spurn Bight—an area of about 10,000 acres which dries out at low tides—would offer major possibilities for port and industrial development. It would require about 10-15 feet of filling to bring it up to the level of high spring tides, with further protection by river walls. The total fill required could amount to as much as 250 million cubic yards, which might come from colliery waste via the inland waterways to the Humber, or from dredgings. (There are plans to use dredgings from the Humberside coast to reclaim Seal Sands on Teesside.) There could well be a national need to develop such a site to permit major growth of bulk processing industries on the lines already achieved by such ports as Europoort near Rotterdam. The National Ports Council in its 1966 Annual Report* put forward the case for such a development in the United Kingdom, calling it a Maritime Industrial Development Area (MIDA). Consultants appointed to survey the country for possible sites have advised that this area of Humberside is one of the three most likely to be suitable. Further study is required of the

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* HMSO, 1967.

TABLE 4a

Selected areas physically suitable for major industrial development

Acres

Ref. No *	Location	All areas	Undeveloped land covered by a planning commitment	Other potential areas		
				Total	Agricultural classification	
					I	II
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	North Bank	28,130	1,840	28,290	10,000	4,000
†	Hull, Ferriby and Brough	2,330	1,840	490	—	—
A	Saltend-Spurn	25,000	—	25,000	10,000	3,200
B	Ellerker Sands	800	—	800	—	800
	South Bank	17,070	5,880	11,180	—	3,300
†	East Halton Skitter-Great Coates	4,730	4,630	100	—	—
C	Goxhill, Killingholme, Stallingborough	6,500	—	6,500	—	—
†	Grimsby-Cleethorpes	470	470	—	—	—
D	Tetney Haven	1,500	—	1,500	—	800
E	Waltham	380	—	380	—	—
†	Scunthorpe-Brigg	790	780	—	—	—
F	Trentside	1,700	—	1,700	—	1,700
G	Melton Ross-Kirmington	1,000	—	1,000	—	800
	All areas surveyed	45,200	7,730	37,470	10,000	7,300

* A, B, C, etc., relate to locations shown on Map 4.
† Derived from Table 9k.

economic and technical issues involved and of the views of the industrialists who might use such a development. Any decision must be national in the light of the country's overall port strategy, but a decision in favour of Humberside would have major economic and physical planning implications for the Area. We have therefore allowed for this possibility in our physical planning assessment, but have not assumed that such a development would necessarily take place. Nor was such a development included in any of the hypothetical sketch plans.

4.10. Even without the recovery of Spurn Bight it would be possible to develop substantial areas of land from Hawkin's Point to Salt End, although only limited access to deep water could be obtained, i.e. by dredging an extension upstream of a deep channel from Hawke Roads to the Hawkin's Point area. There are some 15,000 acres of flat land in this area which might be suitable for major industrial development; about 10,000 acres are however grade I agricultural land.

Other possible industrial sites

4.11. Apart from the estuarial sites there are several areas which could afford large flat sites with good communications for industries not needing close access to deep water. These are all accessible either to existing towns or to areas where new population could be housed. The main possibilities are at:

i Waltham Airfield adjoining the proposed Holton le Clay bypass and trunk road A16.

ii Gunness, near Scunthorpe, which is near the trunk road A18 and the main railway line and can be reached by seagoing vessels of 1,250 tons;

iii Melton Ross—Kirmington where the main four-track railway line, the trunk road A18 and a possible line for a motorway to the south bank traverse the relatively flat floor of a gap in the Wolds. Present plans to develop Kirmington Airfield for charter or private flying could be an asset to an industrial estate;

iv Ellerker Sands near the trunk road A63 and main four-track railway line. This area is unlikely to be effected by height restrictions for Brough Airfield now that permission has been given for high chimneys in the airfield flight path.

The total land potential

4.12. The undeveloped land already covered by some form of planning commitment for industrial development together with the additional potential sites identified above totals about 45,000 acres (see Table 4a). Of this, 37,000 acres of so far uncommitted land are all in large sites many of which could be used by industries requiring access to deep water. Such industries are usually large scale with heavy capital investment, though some employ few people. It is therefore difficult to predict the rate at which such major sites might be taken up, especially in the case of Spurn Bight where land reclamation is necessary; or the numbers that they might employ. There are however very substantial resources for any likely industrial developments.

Land for major residential development

4.13. Outside the areas that might be suitable for the very large-scale industries described above, a high proportion of Humberside's land surface could be built upon if there were a pressing demand for building land. However there are certain physical factors which, though rarely sufficiently weighty to stop development entirely, when taken together influence the selection of the sites that would provide the best living conditions and be cheapest to develop. These constraints have been assessed carefully and stringently, since it is important to ensure that urban development could be made attractive at a reasonable cost to a large population coming from other parts of the country. The most important factors involved in this site selection process are illustrated in Map 5 but the following paragraphs can only be followed in detail by reference to a one-inch Ordnance Survey map.

Topographical factors

4.14. There is no difficult hill country anywhere within the Area; apart from some of the crests of the Yorkshire Wolds nothing rises above 500 ft. and relief, as such, presents few obstacles to development. There is however practically no settlement above the 200-ft. contour. Historically this is attributable partly to the lack of easily available natural water supplies, and partly to the fact that the Wolds, because their crests are whale backed and virtually treeless, are exceptionally exposed and windy. This lack of shelter also leads to snow drifting in winter—the Area's incidence of snow cover, though not in itself outstanding in relation to the height above sea-level, is among the highest in England and Wales. The 200-ft. level, particularly on the north bank, also marks a subtle change from the more varied and intimate boulder clay landscape, into which development might be sympathetically fitted, to gently rolling open vistas where extensive new urban areas could perhaps become too easily conspicuous. Amenity considerations also strongly suggest that building should not swarm prominently over the crests of the Wolds nor up their steep scarp slopes, where in any case gradients would make building expensive and living generally inconvenient. The most comfortable and attractive areas for housing are therefore likely to be found below 300 ft. in the shelter of the southern, higher end of the Yorkshire Wolds, and elsewhere below 200 ft. On this basis the true chalk Wolds could be left virtually untouched by building.

4.15. At the other extreme there are very large areas below the level of high water at Spring tides—about 10 ft. Ordnance Datum. These include not only the estuarine marshlands but also large tracts of the valleys of the Hull, Ancholme and Trent Rivers. These low-lying areas are marginally colder, damper and more susceptible to valley fogs than the higher well-drained chalks and sands. In historic times they repelled settlement until the advent of the railways and the docks brought large-scale housing to Hull and Grimsby. Although they could be made safe in all but the most exceptional flood conditions, and are capable of development at some extra cost, their unrelieved flatness renders them uninteresting areas in which to live.

Amenity features

4.16. Landscape and local natural features influence both the selection of potential development areas and the detailed delineation of their boundaries. In particular the woodlands in the Great Limber area west of Grimsby would form a natural limit to any building areas, while also providing both a setting and shelter. On the Yorkshire Wolds there are several smaller but scenically valuable woods at about the 200-ft. contour which could play a similar role in any scheme for development. The large woodlands at Houghton Moor, which are also a site of special scientific interest under Section 23 of the National Parks and Access to the Countryside Act, could be taken as the northern limit of any possible building area in the North Cave-Hotham area. Twigmore Woods and Manton Warren south of Scunthorpe are also designated as areas of special scientific interest which together with drainage considerations suggest an ultimate limit to any continuous southward expansion of Scunthorpe.

4.17. The limits of possible building areas in more open country are harder to define. Many of the more important landscape areas shown in Map 6 would in any case be excluded from consideration because of their topography. Elsewhere, however, there are scenically attractive sites which might be absorbed partly or wholly into residential areas in a way that could actually enhance their value to the community; but whether this should be done in any particular case needs careful consideration in the light of other planning factors and the extent of the development desired.

4.18. For the most part it should be possible to exclude from development any large sites of special scientific interest and major ancient monuments; protection of most small sites can usually be dealt with at the detailed design stage.

Minerals

4.19. To the east and north of Scunthorpe development is already blocked by the three steel works and their associated open-cast ore workings. We propose in Chapter 9 that discussions should be held with the British Steel Corporation to determine the practicable eastern limits for iron ore workings, but we are assuming that it is most improbable that these would extend beyond the foot of the Wold escarpment marked by the South Ferriby to Worlaby road.

4.20. Other major mineral workings which could affect the location of population are:

i the cement works at Welton on the north bank and South Ferriby, both of which will be important if major growth takes place in the area. Building should not encroach on possible reserves of chalk and clay.

ii industrial sands at Messingham, south of Scunthorpe.

Deposits such as the anhydrite south of Thorne and coal in the Selby area are not in places likely to be suitable for large-scale urban development.

Air pollution and similar factors

4.21. The raw material processing industries, which are likely to be attracted to the estuarial sites considered in paragraphs 4.6 to 4.10 not only need substantial reserve areas for future development but also raise complex issues in their relationship with residential areas. Major chemical complexes in other parts of the country, e.g. Billingham, have caused serious problems where houses have been built close by. The problems range from smell or dust to continuous noise and in some cases include the overpowering effects of living close to structures wholly out of scale with ordinary domestic surroundings. It is probable that rising living standards, increased awareness of environmental factors and greater mobility will bring growing unwillingness to live near major industrial complexes of any kind. In planning new development a cordon of open country should therefore be established between such complexes and new major residential growth areas.

4.22. On the north bank the problem arises immediately only at Salt End where the realisation of the area's full industrial potential could be affected if Hedon, which the local planning authority has proposed for limited growth, were to spread further southwards. Major developments at Spurn Bight or Sunk Island would however create problems for the villages along the Easington Road if they were allowed to expand southwards towards the estuary.

4.23. On the south bank the areas of conflict are more involved. Goxhill is only two miles from Hull in the direction of the prevailing wind, which would rule out offensive industries for that area. Nor could they be located near the villages of East Halton and the Killingholmes which together house about 1,900 people. Another factor is that Thornton Abbey and its adjoining countryside along the little valley of the East Halton Beck should be kept free of all building for amenity reasons. If these restrictions are accepted major urban areas could, in this part of the Area, extend as far east as the railway line between Goxhill and Ulceby.

4.24. Further south Immingham is a growing community with a modern centre and with firm planning commitments providing for a growth of population to 15,000. The location is however unfortunate owing to its proximity to the docks and large plants turning out fertilisers, sulphuric acid and titanium oxide, though it is convenient for workers who need or wish to be close to their jobs. Between Immingham and Grimsby there are smaller, attractive villages, with a substantial housing estate at Great Coates being built by Grimsby Corporation. There is land physically suitable for industry to the east beyond the railway line and if this were developed screen planting and careful attention to the siting of individual factories would be necessary. Even so additional growth of the residential areas at Stallingborough, Healing and Great Coates would create unnecessary difficulties and new major urban development should be kept well to the west of these villages to avoid pollution from the estuarial sites. The exact line is debatable but a possible boundary could follow the Skitter Beck upstream from Brocklesby Park to its source just east of Keelby and thence run west of Suddle Wood and through the Riby Gap; from there the 400 kV line seems a suitable boundary. A feature of this boundary would be that for over half its length it would leave the low ridge, which runs from South Killingholme to Habrough and south to Stallingborough Top, between the main residential and industrial areas. These suggestions would thus place a cordon one to three miles wide between the estuarial industrial sites and any major urban development.

4.25. Air pollution from the steel works as well as iron ore workings is a factor in determining areas for residential use to the east of Scunthorpe. Broughton is not affected, partly because of the woodlands which run north and south between it and Scunthorpe and provide an important amenity in their own right. There is thus an area physically suitable for residential building east of the wood and north of the trunk road A18 but limited by the low-lying land in the Ancholme valley.

Airfields and defence establishments

4.26. The RAF airfield at Leconfield prevents any northward expansion of Beverley and determines the eastward limits of any possible new major urban areas that might be formed in the Lockington-Etton-Cherry Burton area. Should it cease to be needed for flying it could have an industrial value in the context of any large-scale development north-west of Beverley. An alternative industrial area would be the flat land between the railway and the A164 further north in the Beswick and Watton areas. The eastern limits of a potential residential area would then be near the line of the A164.

4.27. There is also a bombing range at Cowden Sands but this is too remote to affect the present Study. The installation in the Holmpton area is also in an isolated part which could be avoided by urban development even if there were to be major industrial growth in the Spurn Bight area.

Transmission lines

4.28. Parts of what would otherwise be open areas of Humberside are crossed by gas and oil pipelines or by a network of overhead electricity lines. In exceptional circumstances some of these might be moved to accommodate new building, but at this stage they ought to be accepted as constraints on the shape of possible development.

4.29. The concentration of power lines at the big switching station at Creyke Beck immediately north of Hull makes the most noticeable impact. At this point they form a barrier to residential development though not necessarily to some industrial development (see para. 11.42). The power line network at Keadby power station, which may be extended, does not directly affect potential building land, but will affect the siting of the improved trunk road over the River Trent. If a large generating station is built on the site owned by the Central Electricity Generating Board at North Killingholme, its transmission system could be sited along the strip of undeveloped land which we suggest (para. 4.24) should be left west of the river bank industrial zone. Other lines do not create major problems.

4.30. Although gas and oil pipelines cannot be built over, the margins that have to be left are relatively small. They do not create serious obstacles to development although they impose a discipline on detailed layouts. The important focus in the pipeline network near Scawby between Brigg and Scunthorpe could, however, affect any re-alignment of the trunk road A18. The several pipelines which run across north Lincolnshire from near Ulceby to Scawby could form a possible northern boundary to any major urban development on the dip slopes of the Wolds and would in fact coincide with the southern extent of a large area of grade I agricultural land.

Influence of natural drainage areas

4.31. In the absence of any other obvious physical boundary we have used drainage factors in setting a northern limit to our search for developable land in the East Riding areas west of the Hull valley. In this area we have not looked beyond the natural drainage area of the Watton Beck. North of this the land falls to the Wellsprings Drain and the River Hull, which follows a tortuous course before turning south. Channel improvements of these watercourses to take increased run-off from major new urban areas would be expensive; a cheaper solution might be to cut a new artificial channel to direct the drainage southwards to the Scurf Dyke. The setting of such a northward limit leaves a very substantial area for consideration and, within it, natural drainage areas offer one way of further division for programming or selection.

4.32. In Holderness, partly because of the haphazard nature of drainage, it is difficult to generalise about the suitability of areas for development. Some parts of this area are low lying and sewerage costs might be high (see para. 11.43 *et seq.*). But in any case, in the absence of an economic incentive such as might be created by major industrial development on the north bank east of Hull, there seems to be little reason for looking at Holderness. Several possibilities could no doubt be explored if necessary; for example, the 1944 Abercrombie Plan for Hull* suggested a satellite town at Burton Constable, and there is land for urban development on the broad ridge which stretches between Withernsea and Keyingham rising clear of surrounding low-lying and ill-drained land. Higher land in the general area of Hedon-Preston-Elstronwick might also be developed should a demand arise from any substantial expansion of employment in, and based on, the developing industrial complex at Salt End.

4.33. On the south bank the southward search for land has not extended beyond the natural drainage areas of the River Freshney and the Buck Beck, since to the south the catchment area of the Waithe Beck leads to Tetney Lock and the Louth Navigation which is a contributing part of the Great Eau water supply scheme (see para. 9.44). These limits to the search area embrace substantial potential urban infilling areas between Cleethorpes, Humberston and New Waltham together with the potential industrial area on the former Waltham airfield.

Locational influence of major roads

4.34. The Ministry of Transport has proposals for substantial improvement of Humberside's approach roads. Here we are mainly concerned with the impact which the lines of these new major roads, and their possible extensions within the Area, could have upon the initial delineation of areas suitable for new urban growth.

4.35. On the north bank existing proposals provide for a motorway standard approach road as far east as Gilberdyke. From here this route to Hull would, we assume, be based on the line of the existing trunk road A63, including the already accepted line for a bypass to Elloughton. This major road would effectively restrict any northward development in the Ellerker, Brough and North Ferriby areas towards the foot of the scarp slopes of the Wolds. The East Riding County Council is also reserving an embryonic line for what could eventually become an alternative east-west route from the main A63 approach road. This line from the Hedon and Bilton areas skirts the northern end of the Wawne Estate. A continuation westwards across the Wolds to a possible route down the scarp face just east of North Cave, and thence to the A83, would cross large areas of possible building land in the dip slope of the Wolds and could coincide with a topographically suitable northern boundary for any major development in that area.

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* *Plan for City and County of Kingston upon Hull.* By P. Abercrombie and E. Lutyens. A. Brown & Sons Ltd., 1945.

4.36. On the south bank plans are being prepared for improving the A18 trunk road as far east as Scunthorpe, including the building of a new bridge over the Trent. Along the eastern extension of this route there are already plans for bypassing Brigg and improving the existing A18 road between Riby and Laceby. At various points this major route could affect areas physically suitable for development. At Scunthorpe the trunk road at present passes through the town. The selection of a line for a bypass would be influenced by the location chosen for the new Trent crossing. This is likely to be upriver of Keadby Bridge which would tend to favour a southerly route. On length of roadworks alone, however, it is unlikely that the route could be taken far enough south to avoid all the physically suitable building land which, according to our physical analysis, extends as far south as Messingham, so that to preserve the option for eventually carrying out a major southward expansion of Scunthorpe a northerly route would be preferable. This route could be found, but it could present constructional and possibly operating disadvantages. Further east there is scope for taking this key route as a high standard road to Immingham Docks and to Grimsby on a line which could dovetail well into the development of large new areas of physically suitable building land. There is an easy route from the proposed Brigg bypass to the western entrance to Immingham Docks and over the section between Melton Ross and Ulceby this could form a suitable boundary between the potential industrial land identified in this area (see para. 4.11) and any large new residential areas immediately to the north. The suggested cordon of open country behind the south bank industrial areas would also offer a corridor for continuing this route into Grimsby, replacing the present unsatisfactory lengths from Kirmington to Great Limber, Keelby and Laceby which pass through large areas suitable for building.

4.37. A second crossing of the Humber downriver of Hull would eventually be required especially if there were major industrial development in that area (see para. 4.96). A possible location might be from immediately south of Paull to just north of the East Halton Skitter, i.e. roughly on the line used for the natural gas pipeline crossing. This crossing need not directly affect potential residential areas but it would be desirable to reserve a line on both banks, through what have been identified as potential industrial areas. The practicability of such a crossing whether by bridge or tunnel requires further study soon.

Total land for major residential development

4.38. Applying strictly the physical limitations so far discussed would still leave for consideration over 90,000 acres of land for urban development—over and above the land which is already committed for building by way of planning permissions and allocations in Development Plans. A list of these possible new sites is given in Table 4b and illustrated in Map 4.

Physical aspects of potential building areas

General attributes

4.39. The nature of the areas with potential for major industrial development has been outlined in para. 4.5 *et seq*. The areas identified for consideration for other forms of urban development (listed in Table 4b) are all well drained, tolerably sheltered but airy and spacious with a pleasant climate, and unlikely to be affected by air pollution. Many of the larger are remarkably free of obstacles to development and very thinly populated. Indeed some of the areas of north Lincolnshire are featureless to the extent that in opening them up to large-scale building care will be needed to avoid monotony. With surfaces consisting mainly of chalk and glacial deposits there should be no major difficulty with foundations, except that some site investigation would be necessary if high buildings were to be erected on boulder clay. Provided, as suggested, that the windy hill-tops and the damp valley bottoms are avoided, climatic considerations favour major development. Average temperatures are slightly lower than in southern England and heating requirements would be greater, but the differences are not large. Taking the average annual accumulated temperature below 60°F as a crude index the comparisons in terms of degree-days are: South Coast 3,000°F-3,500°F, the South East 3,500°F-4,000°F, Humberside 4,000°F-4,500°F. With good development the Area may be expected to have an above-average health record.

Drainage possibilities

4.40. Because of the porosity of some of the surface formations, the low rainfall and the small size of some coastal catchment areas, there are few local watercourses large enough to take the drainage of sizeable urban areas. The Trent, the Hull and the Humber estuary would be the only outlets capable of carrying such discharges without improvements being made to them.

4.41. The minimum effluent standards that would have to be adopted for the discharge of foul sewage from new developments would be indicated

TABLE 4b

Land physically suitable for major residential development

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Nos. on Map 4	Site	Gross acreage: Total	Agricultural classification: I	II	III	Estimated capacity at 22 persons per acre
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Hotham	4·2	—	—	4·2	92
2	South Cave	1·3	—	0·2	1·1	29
3	Ellerker	0·7	—	0·7	—	15
4	South Dalton	16·4	—	15·7	0·7	361
5	Bishop Burton	3·4	—	3·4	—	75
6	Risby Park	2·9	—	2·9	—	64
7	Skidby	1·9	—	1·9	—	42
8	Eppleworth	2·4	—	2·4	—	53
9	Swanland	0·6	—	0·5	—	13
10	Preston	5·0	—	4·5	0·4	110
11	Withernsea	8·1	—	3·0	4·7	178
	North bank	46·9	—	35·2	11·1	1,032
12	Alkborough	3·9	—	3·6	0·2	88
13	Bottesford	0·9	—	—	0·9	20
14	Messingham	1·6	—	—	1·3	35
15	Broughton	0·9	—	0·9	—	20
16	Barton	3·7	—	2·9	0·4	81
17	Wootton	11·1	5·7	4·5	0·9	244
18	Ulceby	2·7	—	2·1	0·5	59
19	Kirmington	2·8	—	2·7	0·1	82
20	Great Limber	7·8	—	7·8	—	172
21	Laceby	9·1	—	2·4	6·3	200
22	Weelsby	0·8	—	—	0·7	18
23	Humberston	0·6	—	—	0·3	13
	South bank	45·9	5·7	26·7	11·6	1,010
	Total, all sites	92·8	5·7	61·9	22·7	2,042

by the river authorities in the light of conditions at the time proposals were formulated. At present it seems that the Humber could be divided into three treatment zones:

i downstream of the North Beck outlet, just below the entrance to Immingham Dock, where sewage, unless it contained toxic wastes, would not have to be treated but might have to be stored for discharge on the ebb tides;

ii upstream of North Beck, roughly from Hessle on the north bank to Goxhill Haven on the south, where continuous discharge of screened and settled non-toxic sewage might be permitted, but sludge discharge forbidden;

iii further upriver and in the tidal stretches of the Rivers Trent and Hull treatment to satisfy the Royal Commission standard* for effluent would probably be demanded. Higher standards might be required for discharge into the River Hull upstream of Beverley.

A more detailed analysis of possible systems is given in paras. 11.43-11.50.

4.42. Disposal methods for toxic industrial wastes have to be considered by individual cases. Nevertheless the large tidal flow in the Humber with complete evacuation on each tide occurring downstream of Killingholme undoubtedly makes the lower reaches a favourable location for industries with effluent disposal problems. There is already a proposal to pipe steel works' effluent from Scunthorpe to that part of the estuary, although it has been suggested that these wastes should be taken further south for discharge at sea between Donna Nook and Saltfleet, possibly as part of a major industrial effluent disposal system. These problems would require further investigation in the event of major development, but should be capable of solution more cheaply than in many parts of the country.

4.43. Because of the absence of sizeable streams in many possible areas for development, the costs of providing sewers to take surface run-off to suitable discharge points could be higher than in areas where it can be taken direct to local watercourses. Some use of soakaways may be possible in areas of development where chalk outcrops at the surface or where it is only thinly covered with permeable sands and gravels. On South Humberside a fine balance already exists between abstraction of chalk water for water supply purposes and aquifer replenishment by rainfall; large-scale development could disturb this by creating extensive impervious areas. For this reason aquifer re-charge through soakaways for surface run-off from new development might both solve the drainage problem and preserve water supplies, provided such soakaways did not silt up or introduce pollution into the chalk aquifer.

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* *Royal Commission on Sewage Disposal: 8th Report.* Cd. 6464. HMSO, 1912.

4.44. On North Humberside the areas most suitable for larger new developments would drain to streams feeding the River Hull and to drainage channels such as the Foulness Drain and the Holderness Drain where flooding could arise if run-off were uncontrolled. Balancing ponds would have to be provided to regulate surface water run-off. It seems likely that sites could be found for these, though their precise locations and costs could not be determined in advance of detailed designs.

4.45. Subsoil conditions, which affect the ease of trench excavation for sewers, are excellent in the chalk but more difficult in the boulder clay areas. They are very difficult in the flat alluvial areas with high water table that comprise some of the major potential industrial areas. Most of the areas have a gentle topography which poses no special problems for sewer construction, but the areas east of the valley of the River Hull have a very broken relief which could mean that some sections of sewers would have to be fairly deep.

4.46. Insuperable problems in dealing with the disposal of foul sewage or surface water should not, therefore, arise in any of the large new areas likely to be chosen for development. Areas liable to flood which would raise drainage problems have already been excluded.

Availability of water supplies

4.47. Existing schemes for increasing supplies of water to South Humberside can at present be relied upon to meet solely the medium-term requirements of the area's existing economy. Only if water from the River Trent ultimately becomes suitable for use in large quantities could present schemes substantially increase supplies after the 1970s. On North Humberside the position in the medium term is better, since Hull will have a call on the considerable potential of the Farndale-Derwent scheme. However other water undertakings also need to draw on this scheme which could not alone secure the whole of Humberside's needs in the event of large-scale expansion. (See paras. 9.36-9.49.)

4.46. Planned expansion could generate an additional demand for 100 million gallons per day by the end of the century, so that major new sources of water would be needed. The Water Resources Board is examining the question of the optimum pattern of water supplies for the whole of the north of England, including a possibly expanded Humberside. Its report should soon be available and we understand that the Board is confident that there are no fundamental problems in securing large supplies.

4.49. The largest single scheme currently being considered in the north is a barrage across Morecambe Bay. But there are more conventional sources that could be combined in various patterns. In the context of a possible expansion on Humberside the Board is considering regulating some of the large Pennine rivers—for example, the Tyne, Lune and Wharfe. Whether or not supplies from such sources would eventually have to be taken to South Humberside depends on what use can be made of Trent water. In view of this uncertainty it would be worth investigating the feasibility of providing for a large water main in the design of a Humber bridge.

4.50. A Humber barrage is not needed on water supply grounds. There is no need to dam the flow of the River Trent by a barrage to obtain sufficient water from it—the real problem is to make the quality of its water acceptable. Impounding the water, polluted as it is now, would merely create new problems, while at the same time running the risk that the Humber's invaluable asset of very deep water in the estuary might be destroyed. It would moreover be necessary to introduce more stringent treatment standards for effluent disposal. We have therefore not examined further the idea of a barrage.

4.51. Water supply should not be a problem for any part of the Area. But the necessary plans would have to be prepared well in advance, because major schemes involving transfer over long distances and exchanges with other water undertakings take years to negotiate, design and construct.

Impact on agriculture

4.52. The potential building areas listed in Table 4b are mainly devoted to large-scale and efficient arable farming. Of the 93,000 acres identified nearly 6,000 acres are grade I, 62,000 acres are grade II and 23,000 acres are grade III land. The balance is made up of areas which are no longer farmed or are regarded by the Ministry of Agriculture as already committed to development. Only a negligible area of the land revealed by the physical sieve is of grade IV or lower quality. The possibilities for major new industrial areas (see Table 4a) would, additionally, involve about 10,000 acres of grade I land and over 7,000 acres of grade II.

4.53. How much of this land would actually be used depends on the size of the development, the type of industry and its precise location. But clearly large areas of valuable agricultural land would be needed for any major development. The costs involved are evaluated in paras. 6.5-6.10.

Areas particularly suitable for expansion

Hypothetical sketch plans

4.54. The total acreage of land identified is greater than could be needed for any programme likely to be undertaken between now and the end of the century. At a density of 22 persons per acre (this covers all land uses including housing, local factories, roads, central areas, open spaces within urban development but not the major industrial areas—see Annex 11A) these new areas, together with the already committed development areas, could accommodate a total population increase of over two million broadly equally divided between each bank. Even with a decision favouring a maximum possible rate of growth there would thus be scope for considerable choice in the selection of areas. It was not our responsibility to prepare a detailed master plan: this could be done only after the major decisions had been taken on the scale and nature of expansion and after detailed consultation with the many interests concerned. Nevertheless we probed the advantages and disadvantages of the main sites and of some of the basic development strategies which might be adopted in order to ensure that the Area's apparently wide possibilities did not conceal major planning snags; to assess such problems as the likely degree of congestion at key points; and to explore whether for cost or other reasons any one broad strategy was prima facie to be preferred above others.

4.55. Examination of the main areas for development showed that they could be grouped to accord with a variety of strategies and that the choice of particular sites for development would to some extent depend upon which of those strategies was considered most desirable. Four were selected for investigation: the building of major new cities, radial development based on Hull, dispersed growth, and linear development. Some of the possible areas for development figured in more than one of these strategies.

4.56. The four schemes we examined are broadly sketched in Maps 7-10. Basically they are:

Case 1 *Two Major Cities:* population concentrated into two new cities, with one on the north bank on a site north-west of Beverley referred to as Lockington, and the other west of Grimsby on a site described as Limber. (See Map 7.)

Case 2 *The Radiating Form:* development focused on Hull with developments outwards from the city in the west to Swanland, Ellerker, South Cave and North Cave, in the east towards Hornsea, and, over a Humber bridge, a major new city immediately across river from Hull. (See Map 8.)

Case 3 *The Dispersed Form:* population scattered in a number of towns, with Hull remaining the only city on the north bank and three large new towns located four to six miles beyond its periphery at North Cave, Lockington and near Hornsea; and on South Humberside a large town or new city at Limber, centrally placed between a new town at Barton and expanded towns at Grimsby and Scunthorpe. (See Map 9.)

Case 4 *The Linear Form:* growth channelled in a long corridor stretching on South Humberside from Grimsby to Barton, and on the north bank from the western outskirts of Hull at Kirk Ella north to Lockington. (See Map 10.)

The assessment

4.57. For each scheme we examined such factors as the effect of development upon the landscape and upon agriculture, the provision of central area facilities, the availability of sites likely to be attractive to industry, ease of providing drainage facilities, the main structure of road systems needed, the costs of transportation and the degree to which the scheme could be readily planned for progressive development. An account of this analysis is given in Chapter 11, with details of our assumptions in preparing the basic strategies.

4.58. All four Cases appeared to be practicable, but none emerged as clearly superior to the others on all the criteria examined. In particular, only relatively small differences in total transport costs (capital and running) were derived by the techniques employed in this exercise. With other criteria the advantages of each Case tended to be counterbalanced by disadvantages. It is possible that greater differences would have been detectable if there had been time to introduce a range of alternative assumptions and to work out in more detail a variety of urban structures within each of the broad locations selected. In any case the basis for an actual master plan for Humberside should draw heavily on the fundamental work on urban structures which is in hand elsewhere. For example research has been and is being done for the Ministry of Housing and Local Government by the National Institute of Economic and Social Research and by consultants into the pros and cons of developing 'green field' areas as against building onto existing towns and cities; and into the attributes of a variety of forms of urban development, for example town clusters, grid patterns, etc. So far results have served mainly to demonstrate how vastly complicated are the questions involved, but eventually some useful general principles may emerge although they are certain to need modifying when applied to particular sites. Whatever views result it seems clear that any one of a wide range of basic structures could be readily introduced in Humberside.

4.59. Nevertheless our work led to some preliminary conclusions about the possibilities of development in particular parts, which in turn are a guide to the strategy that might be most appropriate to Humberside. We have also reached some preliminary views about the infrastructure needs of the Area, especially the basic road network requirements, including estuarial crossings.

Location of major new development

4.60. On South Humberside Scunthorpe is not well placed to become an integral part of large development primarily based on the industrial potential of the south Humber bank. Expansion to a population of, perhaps, 120,000 would not be difficult, but beyond this point problems are likely to arise especially if there is a southern bypass road (see para. 4.35). Expansion by satellite towns using land at Alkborough (site 12 in Table 4b) and Broughton (site 15) with industrial development at Trentside would also be possible. The town is in a position to undertake a Town Development Act scheme at an early date but there is no sign of any employment backing for such an operation.

4.61. The main area for large-scale development on South Humberside lies between Barton-upon-Humber and Cleethorpes where there is extensive land conveniently situated to the south bank. Once a Humber bridge is built this area will have access to Hull's facilities, but the distance to be travelled will be substantial (except close to the south end of the bridge) and there is a danger of overloading the bridge very quickly if major development takes place close to its southern end. In the long term, therefore, new central area facilities would have to be created in South Humberside to meet the needs of a large population inflow. One solution would be to develop a new city in the Limber area using land selected from sites already identified at Great Limber (No. 20), Kirmington (19) and Ulceby (18). Together, these three areas, which are almost wholly grade II farmland, could accommodate nearly 300,000 people. A city could be designed there which would be physically attractive and economical in terms of transportation, drainage and construction costs.

4.62. A decision to adopt the new city solution would have to be taken early and would presuppose that there were to be no second thoughts about the major scale and rate of growth in the Area. Starting with a low level of development would favour dependence on continued expansion of existing communities for as long as possible, and any subsequent jump to the creation of a new city would mean that there would then be an even bigger disturbance of the existing urban hierarchy than if the new city had been introduced at the beginning. On the other hand the city to be fully successful should be allowed to grow to a sufficient size to ensure adequate demand for all the more important central area facilities, i.e. if started it should go on to become a city of at least a quarter of a million. The decision on the future of the south bank will, therefore, be an irreversible one either to build a new city or to confine development to a much lower total population by expansion in or near existing communities.

4.63. A new city at Limber would not preclude continued natural expansion at Grimsby-Cleethorpes, particularly in the areas between Cleethorpes and New Waltham-Humberston. Limited growth by way of a small new town of about 30,000 could also be based on site 16 to which the existing areas of Barton and Barrow, which have a distinctive character of their own, could be married as 'neighbourhoods'. Total population growth on South Humberside would then be over 400,000.

4.64. On North Humberside choice of locations has not been clear cut. A topographically suitable site for a completely new city exists at Lockington (Case 1) but there are doubts about its economic viability, since it would compete with and duplicate facilities which are, or could be, provided by Hull. It would also have an overwhelming impact on the historic town of Beverley. The same criticisms apply to the northern section of the linear form of development (Case 4). Some schemes would also effect scenically attractive areas, for example at Bishop Burton Wold. The large areas to the east would be somewhat further from the Area's main communications links and this factor, together with potentially high drainage costs, argues against developments in the Hornsea area.

4.65. In the circumstances there seem to be basically two broad alternatives. The first would be peripheral expansion of Hull itself; the other would be new satellite towns. Hull is an important asset to the Area as an already established city with major central area facilities. Wherever development may be located on the north bank, Hull will grow in economic importance. It would also contribute substantially, especially in the early stages, to development on the south bank. Its shopping, commercial and cultural activities would expand, leading to pressure on the central area, where there is fortunately space for expansion, and to a steady increase in service employment.

4.66. There are however problems in the peripheral growth of Hull. Being on the estuary it can only expand over a semi-circle and peripheral growth to the north and east would be on flat low-lying land where development is unlikely to be attractive. Northward growth would also carry urban development toward the historic small town of Beverley. The main possibility for pheripheral growth is therefore in a westward direction, which would be counter to current land-use planning policies, since there is local resistance to any further expansion up the dip slopes of the Wolds and to infilling of the open areas between Cottingham and Willerby and between Anlaby and Hessle.

4.67. There are nevertheless major possibilities in the Skidby and Eppleworth areas (sites 7 and 8) to accommodate an additional population of about 100,000. These were only indirectly tested in our model, as part of Case 4. Peripheral development there would take the urban areas of Hull and Heltemprice towards topographical limits in the Wolds. Together with development already planned in the Wawne area a continuous city area with an ultimate population of around 500,000 would be created. Major industrial sites free from amenity objections are not readily available in this part of the Area, which would thus be largely dependent upon Hull's growth as a services, commercial and office centre. If such a development is to be attempted it must be on a substantial scale, since sporadic small-scale western extensions would not produce satisfactory results.

4.68. A recommendation for the other main possibility, satellite growth, was made by Professor Abercrombie in 1944.* To the west beyond the Wolds in the Hotham, South Cave and Ellerker areas (sites 1, 2 and 3 in Table 4b) an attractive town could be created with industrial areas at Brough and Ellerker Sands. Sites 10 and 11 would provide possibilities in Holderness, although these would only be worth pursuing if there were major industrial development to the east of Hull.

4.69. If the two solutions—peripheral and satellite growth—were combined, North Humberside could accommodate up to 500,000 people more than the numbers provided for in present plans and commitments.

4.70. We did not consider in our broad strategies the possibility of development on one bank alone. This cannot be ruled out entirely since, as indicated above, development on either bank could take an additional 400,000-500,000 people, which would be a substantial contribution to the national problem. However any development on Humberside would lead to increased use of Hull's central area facilities, so that even if development were concentrated on the south bank it would have to be accompanied by at least some development in the Hull area. Similarly once a Humber bridge has been built some people may choose to live on the south bank and commute into Hull and the development of the important estuarial industrial sites on the south Humber bank must increase employment opportunities and necessitate additional housing.

4.71. Although it is therefore unlikely that the whole of any new development could or should be wholly confined to one side of the Humber it might be desirable, in further planning work in the Area, to examine the possibility of different phasing of growth on one bank as against the other. We are however certain that major development in the Area will have such wide repercussions for all parts of it that planning to be successful must be an integrated operation affecting both North and South Humberside in terms of housing, employment, roads and other infrastructure.

Areas for smaller scale growth

4.72. This Study has been primarily concerned with the identification of sites suitable for new and very large urban areas. If such growth occurred it would also stimulate considerable demand for housing in the small towns and villages. This would pose problems of how to absorb such growth without at the same time destroying the amenities which the newcomers would be seeking. These have been familiar problems around other growing urban areas and have already shown themselves on Humberside. Nevertheless one of the Area's assets is its remaining unspoilt villages, some of which in the event of economic expansion would, to a necessarily limited extent, cater for a discriminating demand. There are also several attractive small towns, for example, Louth, Great Driffield, Caistor, Market Weighton and Pocklington which, although not studied in detail, appear to have some scope for sensitively planned small expansion. Overall, therefore, the Area could offer during major expansion a choice of environments ranging from rapidly growing cities and established large towns to smaller existing towns and villages. Together these could attract the range of income and social groups that would be needed to make expansion a success.

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* See footnote on p. 21

4.73. Ways in which Humberside might develop in the absence of a large-scale population intake were not examined, because these would not contribute significantly to the national problem and because they would normally be dealt with by the local planning authorities. Whatever the plans for population growth of the Area, however, a cordon of open country should in our view be established behind the Humber bank estuarial sites. These are areas where further growth of major raw material processing industries is in any case highly desirable and almost certain to take place at some time. The manufacturing employment created directly in those areas is not likely to be very great, but would call for a variety of professional skills and grades of workers who could initially be absorbed by the growth of existing towns and villages. Eventually it might be necessary to open up one, or perhaps two, new sites for urban development at places somewhere within the very large areas of first-class building land which this Study has identified between Barrow upon Humber and Laceby. These sites could be designed for populations comprising some multiples of 25,000, the actual size depending on the economic growth of the area. They would provide housing outlets in place of the present ones adjoining the industrial sites, and would also provide an urban nucleus for schooling facilities in the at present sparsely inhabited rural areas of North Lindsey. Such a project could form a very satisfactory future for South Humberside, but its contribution to the location of the national growth of population was too small to fall within the scope of our enquiry.

Communications

4.74. Communications are an important part of any major development plan; after housing they represent the largest single item of expenditure. Transport links with the rest of the country and internationally may be crucial elements in economic growth, and internal communications within an area must be an integral part of its master plan and may influence that plan's basic structure. For Humberside transport is particularly important. The economy of the Area was originally based on port and railway developments, while the inadequacy of roads to the rest of the country has been an important factor more recently in holding back its progress. There is also the unique problem of estuarial crossings.

4.75. We have therefore given special consideration to transportation issues in assessing the physical potential of the Area, under the three aspects:

i transport for international trade;
ii transport for Humberside as an industrial area within Great Britain;
iii transport within the Area.

In each case we have examined both the medium-term prospects and the longer-term possibilities.

Technological change

4.76. The changes which are increasingly arising from the application of scientific discoveries must profoundly influence all aspects of a major development project which would still be under way in the 1990s. Planning would have to anticipate these changes and be flexible enough to accommodate the unexpected. Nowhere is this more true than in communications. Transport developments over the past 30 years have already brought dramatic changes in living patterns and there are other radical developments on the way which will have at least as great an effect.

4.77. With few physical constraints on planning Humberside could be the ideal location to introduce new transport techniques. Since the preparation of detailed plans will not be necessary until about 1976, it should be possible to incorporate techniques which are as yet only in the research and development stage. While trying to foreshadow the possible implications of such major changes we have had to base our work primarily on existing methods of transport.

International transport

4.78. Humberside is one of the major port complexes in the country handling passengers, bulk cargoes like timber, oil and coal and general cargo in unit loads. It is also the country's premier fishing complex. It has already felt the influence of major technical innovations with the rapid growth of roll-on/roll-off and container traffic, and plans exist to expand facilities for handling unit loads and general and bulk cargoes. The Area is extremely well placed to handle traffic to the Continent from a large part of central industrial England and, with vigorous management and an efficient labour force, it could capture a very large part of that steadily growing trade. This growth in throughput should largely counterbalance the growing productivity of the labour force, but not to the extent of creating new employment on a major scale.

4.79. An important aspect of the estuary is the deep water alongside undeveloped land. This has already led to major industrial development at

Immingham and there is the prospect—see para. 4.9—that the area, particularly the north bank, could grow in the 1980s into a major location for landing and processing the contents of large ore carriers and of tankers up to 200,000 tons. Such developments would have important physical planning consequences and some effects on employment.

4.80. The longer term future is also encouraging. The proposed Channel Tunnel would be a major link in any future European freight system and it will be the Government's policy to encourage the use of the Tunnel for the economic benefit of all regions. In this sense Humberside trade will be affected by the Channel Tunnel like the trade of any other port complex in the country. There should not be any specific and far-reaching diversion of European trade from Humberside to the Tunnel, especially as far as the Scandinavian, Elbe and Baltic trades are concerned. Although the Humber is never likely to become a terminal for the million-ton tankers now envisaged and is not competing for the oceanic container trades, it is well placed for the further growth which seems certain in the short-sea European trade. Assuming that the Government's regional policies effect a lasting economic revival in the present Development Areas and other areas of slow economic growth, and that the population of Humberside itself greatly increases, the industrial hinterland served by the ports would be substantially greater, and the Humberside port complex should become one of the most important nodal points of a norther European trunk freight system linking all EFTA and EEC countries (and possibly the rest of Europe) with standardised combined transport services.

4.81. It is much more difficult to assess the future of Humberside as regards aviation. We envisage that a large prosperous community would want direct air links with its main continental trading partners by the 1990s. But the present absence of any major airport for Humberside (see paras. 9.139-9.141) makes it difficult to suggest how this would be achieved. It is improbable that Humberside could become within the next ten years or so a feasible location for a wide variety of international air services—the local demand would not be great enough. International air services will however steadily improve in northern England, for example at Ringway, and as the motorway system improves Humberside should have adequate access to them. In the longer term a secondary network of air services should develop in Europe for freight as well as passengers, and the suggested site in the Goole area might prove particularly well situated for the requirements of a large part of Yorkshire and the Midlands as well as those of an expanded Humberside. There are however other possible locations for a major northern airport and selection in the end will be largely determined by the users. The agency developing Humberside should certainly pay great attention to ensuring good local airfield facilities and to encouraging their maximum use.

Transport links with the rest of Britain

4.82. Whatever the effect on Humberside of closer economic integration in Europe, and however important export markets may be to future Humberside industries, the Area is unlikely to prosper unless its present remoteness from the rest of Britain is overcome. In the 19th century the Area benefited from good railway links; but Humberside has been no exception to the reversal of the relative importance of road and rail transport that has taken place generally during the last 40 years.

4.83. Humberside's extensive railway network is already being contracted and soon rail transport will provide only specialised services for freight and inter-city services for passengers. British Railways' project for advanced passenger trains opens up the prospect of new standards of rail travel with considerable reduction in inter-city journey times. Within the next ten years a journey between London and Hull or Grimsby of under two hours is not technically out of the question. On the freight side, the continued expansion of the freight liner network (with a terminal already in Hull) and of integrated road/rail services as a result of the proposed National Freight Corporation will also reduce much of Humberside's remoteness in the next decade.

4.84. It is however in road transport (and particularly the road network itself) that the most important investment decisions will need to be taken. The lack of past investment in the Area has been most apparent. For example despite local improvements the trunk road A63 from Leeds to Hull still wends its way across the Ouse over a wooden toll bridge erected under the powers of a 'statutory bargain' of the 18th century. But major improvements are coming. The massive road plans already announced (see paras. 9.130-9.133) will result by the mid-1970s in a new motorway, with a high-level crossing of the Ouse, as far as Gilberdyke on the north bank, thus linking Hull to Liverpool via the M62 and to the rest of the main motorway system. The trunk road from the M18 extension will have been improved to Scunthorpe with a bridge over the Trent, thus providing links with the A1 and the motorways.

4.85. Further improvements in road links will be needed, but from Gilberdyke and Scunthorpe eastwards the roads virtually become part of the internal road system of the Area and their improvement will have to allow for any development plans. As the Area grows it would also need in the long term major inter-urban road links with neighbouring towns and cities to the north and south, through the vale of York and Lincolnshire.

4.86. Pipelines are already used extensively for moving solids as well as many liquids over long distances. A common carrier pipeline system seems a probable development and Humberside would be an important terminal in such a system. In the longer term more revolutionary changes in communications are possible, principally as a result of such developments as applying miniaturised components both to telecommunications and transport and of introducing new forms of motive power for vehicles. These would further reduce the Area's remoteness.

Humberside internal transport systems

4.87. The future internal transport links within the Area itself create the most serious problems of long-term technological forecasting. Increasing resources are being devoted to research and development of urban transport. More can be done by improving the effectiveness of existing systems; for example exclusive lanes for buses are already being introduced in some places and the development of bigger hovercraft is being studied. Work is also going ahead on the possibilities of fundamentally new types of transport systems; we understand that current research and development programmes cover a wide range, including urban railways, monorails, automatic self-routing systems (auto-taxis), guided bus systems and pedestrian aids such as fast-moving continuous conveyor systems.

4.88. Resulting developments in the 1980s and 1990s could radically alter the situation in places like Humberside and would thus modify evaluation of urban structures based on present modes of transport, not only because of the possibilities of vehicles having greater speed and convenience, but also because of the town planning potential that would arise from greater scope for segregating types of traffic. But roads will remain important and we have evaluated the broad traffic implications of our sketch plans for development in the Area assuming continuation of ordinary motor transport. Mathematically synthesised patterns of vehicle movements for 1981, 1991, and 2001 were produced for each of our four sketch plans (see paras. 11.61-11.59). An analysis of the resulting traffic flows has shown that on the particular roads described below there would be heavy traffic whichever plan were adopted, and it seems probable that these flows are inherent in the underlying permanent characteristics of the Area.

4.89. On the south bank there is already heavy traffic along the line broadly in mind for a new major east-west road link and it is expected to go on growing at a fast rate. The calculations show that although a bypass for Scunthorpe will be needed it is not so urgent as improvements to other stretches of the A18, for example a new Trent crossing to replace the Keadby Bridge. As we are not proposing large-scale planned expansion of Scunthorpe the decision on whether the bypass should be north or south of the town can be taken as part of decisions about the overall alignment of the A18 (including, for example, the site of the new Keadby Bridge) and an economic assessment of staged construction.

4.90. If a new city were to be located in the Limber area the trunk road between Brigg and Grimsby and the present proposed realignment east of Kirmington would bisect development. Any new major road between Brigg and Grimsby should take a north-easterly direction towards Immingham, with a major intersection near Ulceby and then bear eastwards towards Grimsby, forming the north-eastern boundary of the new city. This network should not only suit whatever form the physical expansion of South Humberside may take, but would accord with present traffic patterns. With a new city at Limber its links with Grimsby would be very heavily loaded, and the traffic flows suggest that there should be a direct through route to Grimsby from the major intersection at Ulceby, located north of Limber. This alignment is likely to suit all forms of physical expansion since it would serve the estuarial sites, use land which ought in any case to be kept clear of building and give a good approach to Grimsby town centre and docks. A new road would be needed to link a Humber bridge with whatever form of planned development is decided for the south bank.

4.91. So far as the north bank is concerned there would be heavy flows in all Cases along the northern bypass to Hull, which confirm the intuitive decision to incorporate such a bypass in all four Cases. In general a greater traffic flow would be generated along the western part of this route than along the present A63. There would also be heavy traffic northwards from a Humber bridge.

4.92. Assuming a northern bypass to Hull as well as the projected southern riverside bypass, calculations of traffic flow within Hull showed no excessive level, even in Case 2 which focuses maximum development on Hull. There was also no sign of excessive congestion at any of the other main intersections in the Area, but there would eventually be saturation on a Humber bridge crossing.

4.93. All the proposed major road routes go through open areas and hardly any demolition would be needed, unlike the position in many areas being considered for development. If it is decided to proceed with planned population growth on Humberside, further work would be needed to check these broad conclusions. The land-use/transportation surveys now being carried out for Hull and Grimsby will provide useful information for recalibrating the transport model and could form the basis of one more sophisticated. Since any transport model must allow for major physical expansion which would radically change the existing urban forms, and since it must take account of radical alterations in the road network brought about by including a Humber bridge, it must be of the synthetic type used by the Unit. Such a model can be adjusted to incorporate such new spatial arrangements and size of populations as planners may wish to investigate. The techniques developed by the Unit should therefore be of continuing value to the Area.

4.94. One of the first planning decisions needed is the line of the routes from Gilberdyke to Hull and Keadby Bridge to Grimsby in order to complete the links between those two cities and the rest of the country. We recommend that work on this should be done as soon as possible bearing in mind the needs of major development as indicated above, and that the roads should be given a place in the preparation pool so that they can be completed before the end of the 1970s.

4.95. Although a road system on the lines indicated would certainly be needed, in the longer term new transport systems and other technical developments would make the projections we have made of road usage to the year 2001 out of date. Similarly the selection of sites for major development which we suggest might be radically changed if new transport systems were developed which favoured, say, linear urban development.

Estuary crossings

The number needed

4.96. Uncertainty from technological change arises acutely when considering possible crossings of the estuary in addition to the proposed Barton-Hessle suspension bridge. The forecast of saturation on a single Humber bridge by about 1991, which arises from conventional calculations of traffic, seems to pose the dilemma of either building the initial suspension bridge with excess capacity for nearly a quarter of a century, or else being faced with needing to build a second bridge (or tunnel) downstream. While the first alternative would be very wasteful of resources, the second needs consideration in the planning and cost estimates of major expension. Before such a bridge or tunnel is built the type of transportation system and the technical possibilities and relative costs of bridges and tunnels will however probably alter out of all recognition with advances in metallurgy and the experience gained from the Channel Tunnel and similar projects. We recommend that further investigation of possible sites for a second crossing be undertaken to establish its most favourable position and that land should be safeguarded for it. We have added a notional £20 million–£30 million to cover the likely cost. (Para. 6.15.)

The first Humber bridge

4.97. We have given very careful attention to the shorter term and more tangible problem of the initial crossing of the estuary—the proposed Humber suspension bridge. In this case we are dealing with a project that might be executed within the next decade, during which time there is little prospect that new transport technologies will have superseded or radically altered the present traffic pattern. The salient feature of the internal transport system of Humberside at present is the divisive effect of the estuary. This has caused both the economic and social development of the Area and its transport infrastructure to evolve in two parallel, but separate, entities. In view of the impetus of the roads programme the continued lack of a Humber bridge cannot be regarded as a neutral factor. The longer it is delayed the more the pattern of two parallel economies on Humberside will be confirmed. The creation of a single transport entity on Humberside is the key to the problems of its city regional transport system. And it is essentially a problem for the next five years.

4.98. The proposal for a suspension bridge over the Humber is long standing. Powers to construct a bridge between Hessle, about five miles west of the centre of Kingston upon Hull, and Barton on the south bank, were obtained when the Hull Corporation promoted the Humber Bridge Bill in 1959. Hull Corporation had already commissioned plans for a single-span suspension bridge joining Hessle and Barton, and the Act provides for constituting the Humber Bridge Board as the highway authority for the project. At that time the estimated cost of a high-level bridge, giving navigation clearance over the river of some 85 feet above high water, was £16 million; the latest estimate is about £13 million. In addition associated road works would be required to link the bridge with the road system. It is difficult to know how much to allow for this—in particular how to distinguish between improvements necessitated by constructing a bridge at any given date, and those which would be necessary in any case by the pressure of increasing traffic in the Area despite lack of a bridge. We have assumed that the cost will be £10 million. The Humber Bridge Board has power to acquire land and proceed with the project; but it has lacked funds to carry it out; a loan sanction of £30,000 was recently made to enable further trial borings to take place.

4.99. A bridge of this kind would be a major engineering project. Its main span of 4,500 feet would exceed the 3,200 feet of the Severn Bridge (excluding the Wye crossing and bridge) and the 3,300 feet of the Forth Bridge: its two side spans, each of about 1,400 feet, would compare with the side spans of 1,000 feet for the Severn Bridge and 1,300 feet for the Forth.

4.100. Suggestions have been made that such a bridge should be constructed purely as a commercial proposition, to the extent that its promoters were prepared to provide capital in anticipation of a commercial rate of return from tolls. If construction were financed in this way it would not be a charge on Government Votes and it would not necessarily be appropriate to regard the bridge as a project needing to figure in the Government's road programme. Whatever the source of funds, however, it is essential to estimate whether the prospective traffic would be sufficient to make it a viable proposition. In this Study we have assumed that it would in fact have to be built with public funds and would be considered by the criteria of the road programme.

4.101. Our report was expected to provide (at least in broad terms) an evaluation of the case for early construction of a Humber bridge as part of the general development of the Area. The present intention is to give priority to the construction of a new road network on Humberside. Announcing this to Parliament on 26th January 1967 the Minister of Transport said:*

> '. . . this decision in no way prejudices the prospect of constructing a Humber bridge as an integral part of any large-scale development of Humberside. The Government will make decisions on that when they consider the results for the current planning studies . . . the bridge will be given a place in the road programme so as to fit in with this development, in the 1970s if need be. . . .'

4.102. We have therefore considered the Humber bridge issue in two ways. First we have estimated the benefits likely to accrue to users of a bridge in relation to given assumed levels of population and economic activity on each side of the Humber—with or without a planned expansion of population of the kind the Unit has considered. Second we have examined certain wider effects that constructing a Humber bridge could be expected to have—not least by stimulating a faster growth of economic activity and population.

The case for a bridge at given levels of population and economic activity

4.103. The techniques of cost/benefit analysis of transport projects are still being developed and refined and the indications of priority that such analyses give cannot yet be regarded as being conclusive. In deciding the composition of the roads programme for any period the Ministry of Transport must also evaluate other constraints, such as ease of land acquisition, and take account in an empirical way of the town and country environmental implications of major changes in road and other communication structures. As far as cost/benefit assessment in the narrower sense is concerned, any proposed road or bridge is expected to show a reasonable rate of return (in terms of the estimated cash benefit to users) in relation to the capital cost involved. During the 1970s it is expected that most schemes included in the road programme will yield first year rates of return of at least 15 per cent. The total resources that can be invested in roads are limited, and any decision to include a scheme showing less than the threshold rate of return would involve the exclusion of a scheme offering a higher benefit.

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* House of Commons Hansard. Col. 1944.

4.104. Estimating rates of return to the users of an entirely new link like a Humber bridge is very complex and much more uncertain than estimating the return on improving an existing road. Calculations have however been made of first year rates of return in respect of the proposed Humber bridge on the basis of traffic prediction models and of various assumptions about future population and patterns of economic activity. Because of the relatively wide margin of uncertainty the calculations are insufficient to justify a more precise conclusion than that a first year rate of return of 15 per cent on the capital cost of a Humber bridge would first be obtained at some period during the ten years 1976-86. The calculations are therefore little guide as to whether a bridge should be built to be operating by 1976 or should be postponed until 1986. What the figures do indicate is that the additional opportunity cost* of building a bridge in time for service in, say, 1976 might be nothing or it might be as much as £7 million. Although these estimates of first year rates of return are, in our view, the best that we can reasonably make in the present state of knowledge, a decision between different possible dates within the range 1976-86 must be based primarily on the more general, but less precisely quantifiable, criteria that we examine below.

The wider issues of the bridge

4.106. The building of a Humber bridge would alter radically the whole pattern of economic and social interchange in the sub-region. In time it would lead to the integration into one economic unit of two substantial areas which have so far developed separately. There is little experience from which to judge the pace at which this would occur; but the transformation would be profound as the new economic and social opportunities were exploited. The Area's change towards a unified pattern would not begin until the opening of a bridge had become a sufficiently certain event to affect the plans of individual firms. Until that time the private sector, and much of the public sector, would continue to plan and develop on the basis of independent growth and renewal on each bank separately, particularly in the service trades which are those likely to be most affected by the opening of a bridge. For example, transformation of Hull into a service centre for a unified sub-region cannot begin until Hull businessmen can develop markets among the population and industry of the south bank.

4.108. The longer a bridge is deferred the greater the likelihood that central area facilities will become set in a pattern which duplicates 'lower order' facilities on each bank, while the creation of 'higher order' facilities is inhibited by lack of a sufficiently wide catchment area. This is particularly important now when a major transformation of the central areas in South Humberside is under way.

4.107. These dangers would be somewhat reduced by eliminating uncertainty about building a bridge through a firm announcement of the intention to complete it by, say, 1986 at the latest. Such a date is, however, a long way ahead and firms would still make their short-term plans on the basis of a divided Area. Only a firm commitment to a relatively early completion date could be expected to have any major effect on the plans of the private sector. Public authorities would also have little power to prevent misdirection of investment, because, owing to the short-term demand on them, they would have to continue to provide facilities on each bank.

4.108. Present knowledge does not permit us to measure precisely the costs of this likely misdirection of economic activity. They would be substantial, because very widespread. We doubt whether these considerations would themselves justify advancing the date of completing a bridge by as much as five years, but whether they affect the timing by six months or two to three years we cannot say. Thus, although there are arguments for earlier completion, they would not, except on very optimistic assumptions about the beneficial effects of a bridge, fully justify completion in the 1970s without also taking into account the prospects of selecting the Area for planned expansion.

4.109. Here there are two key questions. First what is the desirable timing for a bridge in relation to that of a build-up of population and employment? Second to what extent would the building and opening of a bridge contribute to maintaining the level of economic growth necessary to justify the selection of the Area for planned population expansion; and how would this measure compare in real costs with other measures that might be adopted?

4.110. A bridge would be essential at an early stage of major planned expansion. Neither bank alone appears to have the economic potential (see Chapter 6)—particularly the combination of a thriving general base and some thrusting growth industries—to provide the necessary growth in employment, but joined together they would provide a better base. Moreover the greatest difficulties in generating on Humberside the momentum of economic growth to support a large additional inflow of people would arise in the early years of expansion, and it would be then that the extra economic activity generated by joining the two banks could be particularly valuable. There are also major physical planning advantages in having a bridge open at the start of planned expansion. Whatever master plan is finally adopted for the pattern of settlement, there must be periods in which there would be imbalance between the growth of population and of the services and facilities required. The greater flexibility arising from accessibility on one bank to facilities on the other would help substantially to ease timing problems, thus more quickly making the Area one in which the qualities of a settled urban environment are available to newcomers.

4.111. But there would also be major advantages in having the bridge open before any start of major planned population expansion in the 1980s. Radical improvements to Humberside's road connections with the rest of the country should be complete by the later 1970s. These would substantially increase the Area's attractiveness to manufacturers, who regard its remoteness as a major economic deficiency. The flow of business to the Area is therefore likely to accelerate at this time. If by then a bridge is also complete, the attractiveness would be greatly reinforced by access to both a wider range of commercial and service facilities and to the larger pool of labour.

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* In the sense of the discounted cash value of the extra benefits which would be obtained from investment of the resources in some alternative road programme scheme in 1976-86 over and above those obtainable in the same years from a Humber bridge.

4.112. It would also be important that detailed decisions about location in the Area during this accelerated inflow of business should be based on established unity between the banks. The combined effects of these two major improvements in communications would be substantially greater if introduced simultaneously than if they took place separately. By causing more rapid economic growth the effect would be to reduce the subsequent cost of any financial incentives needed to get major planned expansion going.

4.113. The early building of a bridge could also play a significant role in maintaining the economy of the Area in the period before planned expansion started. There are weaknesses and signs of faltering in the local economy (see Chapters 5 and 10), which if they persist in the 1970s would make planned expansion in the 1980s difficult; if they grow worse it would be almost impossible to get expansion under way. Building a bridge is one way to support the local economy in this key intervening period. Some local labour would be employed in its construction, which would add to the Area's prosperity. As soon as it was open, and indeed for a year or two before, it would encourage growth and investment in industry. There are other ways in which the economy of the Area could be stimulated during the 1970s, for example by financial incentives to industry. But owing to uncertainties in calculating the first year rate of return on a bridge, it is impossible to say whether the real cost of bringing forward its completion to the mid-1970s would be greater or less than an equally effective financial stimulus to industry.

4.114. There are, too, psychological considerations to be taken into account. The deeply held belief in the Area that constructing a bridge would give it the greatest stimulus must be taken into account. Planned growth would only be a success if the local people were prepared to welcome the idea and plan and act together. A government decision to build a bridge in the near future is the one act which would symbolise far more than any other the Government's own belief in the future of the Area and would have the most potent galvanising effect on the authorities, businesses and people of the Area and on those contemplating movement to it. The best chance of all that this Area's potential for growth would, in fact, be realised could thus be created.

4.115. If it is decided to proceed with planned expansion on a scale involving major intake of population in the early 1980s there is therefore a strong case for bringing completion of a bridge forward into the 1970s, preferably as early as 1976. The short-term balance of costs over benefits would be somewhat less than the direct opportunity costs of from nought to £7 million, but over the longer term the net savings on the costs of the whole project for major expansion could be substantial.

A summing up

4.116. Humberside is endowed with extensive areas of land specially suited for large industries, including major raw material processing and similar plants needing to be close to deep water. We believe these valuable areas should be exploited. This could involve early action to:

i secure formal delineation of their potential extent and their protection by setting up a belt of open country along their landward boundaries;
ii secure additional water supplies;
iii remove present financial discrimination against the movement of bulk processing industries to Humberside.

The rate at which these major sites could be taken up is bound to be uncertain and the numbers directly employed could be relatively low.

4.117. There are also large areas of physically developable land which could offer a variety of ways in which very large additional populations could be attractively accommodated. For example a westward expansion of Hull coupled with satellite growth farther west, and possibly east, would provide for an additional 400,000-500,000 people. Similar numbers could be housed on the south bank by, for example, building a new city in the Limber area and expanding existing towns.

4.118. Two physical planning problems militate against an early start to any major population expansion:

i the Area is separated from the country's main centres of population and industry by an inadequate road system, although major new approach roads built by the mid-1970s and eventually advances in transport systems will help to overcome this and enhance its position as an important trading link with Europe;
ii the Area faces a large housing replacement programme.

4.119. There is a strong case, if there is to be major planned development in the 1980s, for completing the first Humber bridge in the 1970s, preferably as early as 1976. Even so the estuary will continue to be divisive and development on South Humberside will still need its own large-scale central area facilities with development there not being so close to Hull as to lead to overloading the crossing.

4.120. We have no doubt that provided the loss of high-class agricultural land can be accepted, the Area would be ripe for population expansion in the 1980s, and that careful planning and good quality design could produce a fine city region with admirable living and working conditions for a very large intake of population. In the main the favourable physical circumstances would not alone ensure or make necessary such growth. Its promotion would have to be undertaken primarily for social and economic reasons, i.e. if it is considered to be a place where costs and benefits are favourable by comparison with other possible locations.

5 PLANNED GROWTH: ECONOMIC POTENTIAL

Employment needs of planned growth

5.1. A major economic issue in considering a large population expansion on Humberside is whether there would be work of sufficient volume and quality to attract newcomers to the Area. This involves assessing its economic potential and the effects on that potential of major development during the build-up, which in the case of Humberside would be largely in the 1980s and 1990s. We have therefore had to make an assessment covering the next 30 years. This has proved very difficult but essential for arriving at any conclusion on the possibility of major growth.

5.2. Humberside has had a chequered economic history in recent years, economic stagnation before the second world war being followed by serious bomb damage during it. Since then there has been a recovery and growth in which employment in the Area expanded faster than the average for Britain as a whole, the main elements being increased employment in the steel works at Scunthorpe, in food-processing, chemical plants and personal services. Most of that time growth has been greatest in the service trades, and female employment, which was well below the national average, has grown particularly rapidly. However, the Area still suffers above average unemployment, below average incomes and net outward migration. Chapter 10 describes these developments and gives estimates of the possible future supply/demand position for labour in the Area up to 1981. Humberside's share of national employment is likely to continue to grow, although possibly at a slightly slower pace, resulting in a substantial increase in demand for labour in the Area. But numbers seeking work will also increase rather faster than in Britain as a whole, partly because of the high rate of natural increase among the local population in recent years, partly because local activity rates seem likely to rise. The general conclusion in Chapter 10 is that during the 1970s there might be some shortfall of jobs for men; jobs for women on the other hand seem likely to grow faster than the number of women of working

TABLE 5a

Humberside: total population 1976–2001
(projections with and without planned expansion)

	1976	1981	1986	1991	1996	2001	Annual rate of growth 1976–2001 %
Indigenous population							
Number '000	827	857	888	926	969	1,013	
Annual rate of growth in the quinquennia (%)		0·7	0·7	0·8	0·9	0·9	0·8
Minimum scheme of expansion							
Number '000	827	873	928	1,012	1,150	1,326	
Annual rate of growth in the quinquennia (%)		1·1	1·3	1·7	2·6	2·9	1·9
Maximum scheme of expansion							
Number '000	827	881	993	1,201	1,452	1,746	
Annual rate of growth in the quinquennia (%)		1·3	2·4	3·9	3·9	3·8	3·0

Source: **General Register Office.**

TABLE 5b

Humberside: population aged 15 and over 1976–2001 (projections with and without planned expansion and annual compound rates of growth)

	1976	1961	1986	1991	1996	2001	Annual rate of growth 1976-2001 %
Indigenous population							
Number '000	615	642	667	669	715	742	
Annual rate of growth in the quinquennia (%)		0·9	0·8	0·7	0·7	0·7	0·7
Minimum scheme of expansion							
Number '000	615	653	693	746	834	950	
Annual rate of growth in the quinquennia (%)		1·2	1·2	1·5	2·3	2·6	1·6
Maximum scheme of expansion							
Number '000	615	658	732	669	1,033	1,230	
Annual rate of growth in the quinquennia (%)		1·4	2·2	3·5	3·5	3·6	2·8

Source: General Register Office.

age (especially on North Humberside) though not necessarily faster than the number which could be attracted into work. The possible shortage of jobs for men is more significant, and unless the Government's industrial policy towards the Area changes, the net outward migration typical of the Area for many years seems likely to continue; and whereas it was formerly confined to North Humberside, with some inward migration on South Humberside (see para. 2.10) it could be outward for both parts of the Area. Recently there have been signs that employment growth may be slowing down; if this means a change in the secular trend the likelihood of substantial net outward migration is increased. It is against these uncertain prospects up to 1981 that we have had to consider the problems of planning major expansion in the Area.

5.3. The size of these problems can be seen by comparing projections of total population on Humberside (Table 5a) and populations of working age (Table 5b) with the two alternative patterns of possible expansion we have postulated (see para. 2.11) against the expected natural increase in the present population.

5.4. Taking the estimates of population aged 15 and over in Table 5b and plausible assumptions about activity rates, it is possible to infer a reasonable estimate of the numbers seeking work at successive dates. In the 1980s and 1990s national activity rates are unlikely to alter greatly—increased years spent on education being roughly offset by a continuing rise in the proportion of married women at work. Humberside's activity rates are growing steadily and should reach the national level by 1981. Thereafter the upward trend would be checked by the large numbers of wives with small children in the incoming population and the rate would remain broadly in line with the national rate. The growth in the numbers seeking work will therefore be of a similar order of magnitude to the growth rates in Table 5b and the average annual compound rate of growth of employment under the minimum scheme would have to be about 1·8 per cent for the whole period to the year 2001 and 2·8 per cent for the maximum scheme. By contrast the growth needed to provide employment for the increasing indigenous population is 0·7 per cent per annum. The average rate of annual growth in the Area from 1953 to 1958 was 1·5 per cent, while the highest rate of growth achieved in any one year was 2·4 per cent in 1961. Thus our maximum scheme calls for growth rates to be sustained for 25 years at a rate higher than the best recent year and substantially higher than the average.

Prospects for service and office employment

5.5. The expected growth in the ratio of service employment to total employment is an important factor in considering employment prospects. Recent experience throughout the western world has been that the percentage of total employment devoted to services has grown steadily. In the United States this has been particularly marked, and if the developments there indicate future developments in Britain it seems probable that service employment (including construction) will increase to between 65 per cent and 70 per cent of total employment by the year 2000, as against 58 per cent in 1957. The types of employment within the service category will change since the widespread use of computers should lead to substantial savings in routine clerical operations, but this will be more than counter-balanced by the growth both of administrative and technical personnel attached to each industry and of most public and private services. Within this total, construction could rise from the present 7 per cent of total employment to about 9 per cent, since even with more labour-saving techniques, experience in the United States (over a period when productivity approximated to that likely in Britain over the next quarter-century) has been that construction manpower requirements have expanded steadily. Although total employment in Britain by the end of the century must grow substantially (if the much larger number of adults are to find work), the effect of a higher percentage in service employment will be that the numbers in manufacturing employment will only be increasing slowly in absolute terms during the 1990s and 1990s.

5.6. In view of these considerations we have assessed the prospects of extra employment opportunities on Humberside in the service sector, and later examined the question of manufacturing employment.

5.7. Some service industries cater predominantly for the needs of the local population of the area in which they are situated, while others are oriented more towards a national (or even international) market. Examples of locally oriented groups are to be found in health and education services, retail trade and local government employment: examples of services with a major national component are airports, insurance and banking, the service activities connected with international trade, central government employment and many of the other central services at present heavily concentrated in London. A firm line cannot be drawn between these two main types and data about their size and constitution is largely lacking. But there is no doubt that at present most services are locally rather than nationally oriented. Moreover the growth in public services is likely to continue to increase the percentage of the population employed in locally oriented public service industry, so that the predominantly local orientation of service employment is likely to continue.

5.9. The ratio of service employment to population is therefore a convenient measure of the state of development of an area's services. In some service trades in Humberside this ratio is below the national average and may still be below the national average in 1991. Therefore even without adopting Humberside as the site for a new population centre some advance in the Area's endowment of service industry seems likely to bring it closer to the national average.

5.9. There also exists in most of the service industries catering for consumer demand what is sometimes called a 'hierarchy of provision', whereby the standard of service provided in any town or city tends to vary with the numbers of people living both in it and in the areas which it serves. In retail trade, for instance, the tendency for this hierarchy is very clearly apparent—with the large department store and specialist shops only appearing when the population of a town and its surrounding hinterland has passed a certain size. As the standard of living rises and the relative cost of transport falls in future, the importance of the larger urban centres seems likely to grow, with progressively more retail trades being organised into larger units. In contrast with most other urban areas Hull's population hinterland is small and opportunities to establish highly specialised types of shops and other locally oriented services are therefore limited by comparison with major conurbations. Population growth would stimulate a new level of provision in Hull. Smaller shopping centres might suffer but there would be a net increase in total employment in the Area. Other specialised services would grow in a similar way. Grimsby should also experience similar improvement —at least until the new city at Limber (see para. 4.56), if it is built, grows to major size.

5.10. Another important factor is that Humberside's needs for building labour are certain to go on growing. Humberside's long-term housing problems and the possible growth of large bulk processing industry in the 1980s (see para. 5.19) should result in an upward demand for construction manpower exceeding the national average. When the needs of a large incoming population are added to these requirements, the rate of house building is likely to be about three times the current rate, in the case of the maximum scheme, and other new constructional activity is likely to grow proportionally. Contractors will have every incentive to maintain large resident staffs and not rely on a temporary labour force. A convenient approach to quantifying the level of construction employment is in terms of its ratio to total employment: Humberside's should be about 9 per cent in 1991. In view of all these factors it is likely to reach a peak of around 12 per cent in the 1990s, but would drop by the year 2000 to about 10 per cent in the case of the maximum scheme. It would be about 9 per cent for the minimum scheme—the same as the estimated national rate at that time.

5.11. Services of all kinds connected with the traffic of the Humber ports are the main instance at present of service industry predominantly geared to international markets. Trade through the Humber ports should continue to grow steadily during the rest of this century, particularly on the short sea routes to Europe. The bringing in of substantial populations and accompanying industry nearer to these ports than they would otherwise be is likely to provide a further stimulus. However the effect of this growth on employment opportunities in the Area will be small owing to a prospective further fall in the numbers required at all ports per unit of traffic handled (see para. 10.55). Increased shipping activities in Humberside might encourage shipping firms and shippers to establish offices in the Area, but their contribution to employment prospects is unlikely to be great. Thus service employment associated with port activities should only rise slowly.

5.12. So far as new possibilities for nationally oriented service industry are concerned, suggestions have been made that a site may be found in this Area for either a 'second capital' or a 'capital of the North', partly with the object of relieving the strain on London's resources. The case for development which could be described in those terms did not seem compelling enough to warrant detailed consideration in this Study. There appear to be definite limits to the extent to which many of the functions carried out in London could be performed elsewhere. Those functions associated with London's role as the political and administrative capital would need a position central to the whole of the north of England if the new location were intended to become the capital of the North. Humberside is off-centre for this purpose. Some reduction in the strain on London may be achieved by increased devolution of government activities to the regions. But even in regional terms Humberside is not likely to become the cultural or administrative capital for a major region, no matter how much it expands. If a new system of larger local authorities with increased responsibilities were to be created, Hull would clearly be the focus of a city region, and could gain more in public service employment than the other local authorities in its Area would lose. These are issues for the Royal Commission on Local Government and the Commission on the Constitution and the effect of their proposals and of government decisions on them on employment in this Area cannot be prejudged.

5.13. Humberside has, however, potentialities well worth exploring as a major sub-regional centre for service employment in the private sector. With the development of modern communications, the economic advantages of concentrating in or near London such service employment as routine office work, computer centres, research laboratories, etc., are declining. Some will disperse to existing major towns, but others may search for new areas conveniently situated for communications, but in pleasant surroundings away from ugly or congested older towns. Humberside has sites that could be developed on a large scale as research and commercial office centres very pleasant to live and work in. Its promotion for these purposes would however call for a new national policy involving the deliberate encouragement of a limited number of major office centres well away from London, since otherwise the natural tendency would be for office dispersion to take place within or near the South East. If this policy were to be introduced the selection of the new office centres would be a difficult task, but we believe that Humberside's location should qualify it for serious consideration as one long-term possibility, and that its selection would be a potent way to initiate major population development in the Area. Applied to industrial research activities as well as office employment this development would in turn tend to attract science-based industry to the Area and thus stimulate new industrial employment. Developments of this kind could make a significant contribution to the Area's attractiveness for population and employment by providing a better balance in available jobs. But it could not come about without deliberate planning nor, in the Unit's judgment, without using some financial incentives in the key first stages of development.

5.14. A further consideration is that in the experience of new towns there is a higher than average proportion of employment in manufacturing industry during the early stages, due to the need to provide mainly male employment (a high proportion of women will have young children and this would tend to discourage growth in the services which rely on female labour) and to the unwillingness of some providers of local services to move into an area until the size of the potential clientele exceeds a certain threshold. Whether this would apply in the early stages of a major integrated growth covering the whole of the Humberside Area is difficult to judge. There might be a low level of service employment in the early stages of any new towns, but the demands of the population of these towns for services would have to be met somewhere in Humberside, which could only be in the existing main towns.

5.15. Humberside's ratio of service employment (excluding construction) to total employment is expected to be 54 per cent in 1981 and it seems unlikely that there would be such a lag in service employment growth during the initial stages of a major build-up that this percentage would fall. Service employment should at least grow *pari passu* with the population. Nationally, however, service employment will be a growing factor of total employment so that Humberside would tend at first to lag behind the national trend, gradually catching up as development matured. Taking all these considerations into account we have concluded that by the end of the century service employment in the maximum scheme should be at least 57 per cent of total employment. For the minimum scheme the percentage might be somewhat lower—about 55 per cent. There is a danger that the type of service employment in the Area would be of somewhat low quality unless a special effort were made to bring in the office and research employment referred to in paragraph 5.13. Even during the early stages of major development the depressed level of service employment should be partially counter-balanced by the high demand for building labour (see para. 5.10)

Prospects for manufacturing employment

5.16. If these expectations for employment in construction and service industries are fulfilled they would reach 67 per cent of total employment in the maximum case and 64 per cent in the minimum case by 2001. Thus broadly two-thirds of the employment needs of a major population growth will be provided by the demands for services by the population themselves. Primary and manufacturing industry would have to make up the remainder. Table 5c shows the figures for the minimum and maximum schemes of expansion on this basis (assuming that primary employment remains static after 1981). The employment figures for 1981 are from Chapter 10.

5.17. Humberside's manufacturing employment on these figures would have to increase by 38 per cent for the minimum scheme and 69 per cent for the maximum scheme over employment levels in 1981. In terms of its share of national employment in manufacturing the level would have to increase from 15 per thousand in 1981 to approximately 30 per thousand on the minimum and approximately 35 per thousand on the maximum by 2001. Since a continuation of Humberside's growth in the years 1953-66 would only raise its share to 18½ per thousand by that time a great increase in present growth rates would be needed. The fact that national employment in manufacturing will not be growing markedly during that period underlines the problem of achieving rapid growth on Humberside. Moreover because of the possible lag in the growth of

TABLE 5c

Humberside employment: actual 1967 and projections 1981 and 2001

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	1967	1881	2001	
			Minimum scheme	Maximum scheme
Labour supply	307	350†	530*	690*
Primary	18	10	10	10
Manufacturing	118	130	180	220
Construction	21	30	50	70
Services	151	190	290	390

* Figures deduced from Table 5b by applying activity rate of 56 per cent.

† Figures do not add up to totals due to rounding.

Source: Based on material supplied by Department of Employment and Productivity

service employment at the beginning of major build-up it would be particularly necessary in the early stages to provide sufficient male employment in manufacturing industry.

5.18. As regard the specific and identifiable advantages of a Humberside location for manufacturing industry, those deriving from local supplies of materials seem likely to be of diminishing importance in the 1980s and 1990s. The past growth of the steel industry occurred because of the large local iron ore beds; but access to home ores is now of dubious long-term value. The long-term prospect for steel—even if Scunthorpe is selected by the British Steel Corporation for further development—is probably one of rapidly rising productivity but fewer jobs. In food-processing too supplies of local agricultural and horticultural produce may eventually impose limits on the further growth of the local industry.

5.19. The value of Humberside's estuarial sites with access to deep water is a more enduring factor, and its importance may indeed increase since in bulk processing industries such as chemical and food processing both the optimum size of plant and the average tonnage of transporting ships are tending to increase. At present the financial inducements offered to industry to locate in the Development Areas discourage location of capital intensive industry on Humberside (see para. 10.50). The Unit recommends that if it is decided to encourage population growth on Humberside in the 1980s, the bulk processing industries should not be discouraged from locating in the Area by such relative financial disadvantages. This should lead to an upsurge in this type of industry using the substantial quantities of land with ready access to deep water still available on both banks. The demand for land might become so strong that the recovery of the Spurn Bight area (see para. 4.9) would become a profitable commercial proposition. Alternatively this area might be specifically designated by the Government as a MIDA with special efforts to encourage its use by suitable industries. But even so it is difficult to estimate how quickly additional facilities could be provided in the Area or the rate at which bulk processing industries would grow. The reclamation of the Spurn Bight area and the subsequent construction of the processing plants would provide substantial building work, but the employment provided by the works themselves when in operation would in many cases be small. On the other hand designation as a MIDA could enhance the Area's image and thus stimulate the economy generally. There might at a later stage also be some growth of associated service industry and of secondary manufacturing industries—a point considered below. In view of the uncertainties at present surrounding the whole MIDA project it would be wrong to assume a major contribution to employment growth in the Area arising from this particular possibility. Even without it, growth of bulk processing industry generally in the Area should provide some new employment.

5.20. Another possibility is that energy-using industries and industries making use of natural gas as a feedstock might find Humberside an attractive location. Humberside is one of the two present off-loading points for North Sea gas, but the bulk transport cost of gas is very low in relation to its probable landed price, so that for all ordinary users of natural gas as energy there will be no important savings in a Humberside location. Even marginally cheaper gas could, however, increase Humberside's attractiveness to industries making use of natural gas as a feedstock and to heavy energy-using industries such as non-ferrous metal smelting. This would depend on a pricing system that gave large users of natural gas the benefit of slightly lower resource costs near a landing point. Even so it is more likely that natural gas might be a slight bonus to bulk processing industry which would develop on Humberside in any case rather than an important locational factor in itself. The Area is also near the country's most efficient coal producing areas and new major electricity generating stations (see paras. 9.33 and 9.37) but with falling transport and transmission costs neither is likely to exert an influence over locational decisions except perhaps for the heavy energy-using industries mentioned above.

5.21. Although not providing a major source of additional employment in themselves the bulk processing industries might be a factor favouring accelerated growth on Humberside of other industries using their products, or otherwise linked with them. This raises the difficult issue of linked industries. In the earlier history of industrial growth in Britain very large centres of basic industry tended to attract users of their products, suppliers of their plant, and specialist services of various kinds, so that there grew up in our main existing manufacturing centres an intimate complex of linked firms. It is important to consider whether these are likely to develop in the future round the new basic industries which are now developing. It cannot be assumed that this is inevitable. The increased general efficiency of transport has sharply reduced the advantages of location in proximity to suppliers. It is only in industries which require very heavy or very bulky supplies—such as heavy chemicals, oil refineries and steel manufacture—that these factors remain important and even then long-distance transport, e.g. by pipeline, is becoming more common. Proximity to markets—or to communications that will give ready access to national and international markets—is nowadays more important for many industries than proximity to suppliers.

5.22. Nevertheless industrial complexes still have important advantages if they can be achieved without extra costs. It is still somewhat cheaper for an individual firm if its components or raw materials can be brought from only a short distance so that stocks can be kept low. There are also external economies if enough firms of a similar kind can be located reasonably close together to provide a large enough local market for the development of a pool of qualified labour (with its associated specialised training and education facilities) or to attract the firms which provide specialised services. The gains however take a long time to accrue in any new area. The first firms necessarily bear the extra costs that arise before a complex has developed, and, in comparing the attractiveness of one area to another, an existing complex offers major advantages.

5.23. The information from the Humberside industrial survey* indicates that existing industrial linkages in the Area are not exceptionally important. The three industries which have sales within the Area of over 20 per cent of total sales are all like the building materials industry for which the cost of transport to the final consumer remains an important element in total cost. The existing structure of inter-firm relations on Humberside does not therefore suggest exceptional potentialities.

5.24. The Unit was able to give only limited thought to the possibilities of linkages developing from the availability of basic materials already produced in the Area or imported through the ports. Although it has been there 50 years the steel industry of Scunthorpe has only limited offshoots and sells most of its output outside the Area. This is unlikely to change quickly so long as the types of steel produced at Scunthorpe remain unchanged. Indeed the boat and aircraft building industries on the north bank are more likely to act as a stimulus to engineering development since they have the right types of skilled labour. The timber-using industries are prima facie a possibility since the Humber is a major timber port and there are timber-using firms in the Area already, but nationally this is not a fast-growing sector and even a much larger market in the Area for furniture and other wooden articles would not necessarily attract industry from its existing locations. The manufacture of components in timber or plastics for the building industry might develop since planned expansion would generate a large local market for components and for prefabricated houses. There is also some prospect that the growing chemical and petro-chemical complex in the Area might attract user industries for its products, e.g. in paint, plastics or pharmaceuticals. This is particularly a field where technical changes could produce entirely new developments. Such possibilities should certainly be explored if it is decided to go ahead with population expansion.

5.25. The general conclusion is that although the specific factors favouring Humberside as an industrial location indicate some promising possibilities they do not offer any firm prospect of a major acceleration in employment growth in the Area by comparison with the rest of the country.

5.26. An appreciable part of the growth in employment will therefore need to come from the general run of manufacturing industry for which Humberside has no evident locational advantages.

5.27. On the *north bank*, where the bulk of general manufacturing industry is located, it is only eight years since Hull was classified as a Development Areas Treasury Advisory Committee (DATAC) area for a short time because its unemployment rate was substantially above the national average. Since then progress has been considerable, and in Chapter 10 we have concluded there will be further growth during the 1970s. Growth in the engineering industries in particular should continue. It seems likely, therefore, that even without major planned development the general industrial base on the north bank will be rather stronger by 1981 than it is today.

5.28. In spite of this progress there will still be drawbacks to the Area as a place in which to promote major economic expansion of manufacturing industry. For example Hull's policy of keeping local authority rents at a low level means that the contribution from rates to housing revenue has to be substantially higher than the average. This could be a deterrent to new industry and commerce. As far as the appearance of the city is concerned great progress is being made towards creating a modern, lively and cultured community. Nevertheless this has not yet been sufficient to dispel a commonly held belief that on Humberside (and indeed throughout the north) the quality of life is drabber, poorer, and less interesting than in the south. This misconception remains a disadvantage for the Area generally.

5.29. More serious is the consideration that Hull is not yet a major prosperous industrial area. Although our suggested plans incorporate industrial centres outside Hull, the prosperity and image of Hull and the Hull area would be crucial for the growth of general manufacturing industry in the initial stage of any expansion. Its general manufacturing industry is not very broadly based and, in particular, elements of the engineering and electrical industries from which it seems probable that a substantial part of the country's new industrial employment will arise in the next few decades are not represented in the industrial structure. The area generally has had notably successful enterprises but many more people with new ideas and outstanding managerial skills would be needed to provide the necessary growth stimuli. Even by 1981 it seems likely that Hull will still have a relative lack of highly skilled workers owing to its particular industrial structure. Competitive levels of unit labour costs require a well-trained labour force with sound industrial experience, and growth in any area can be substantially affected by the quality, range of skills and adaptability of its labour force. Progress on this score would be needed and educational and training facilities at all levels would have to be expanded in the Area. The provision of such facilities on both banks should be an integral part of any planned expansion.

5.30. As regards attracting new industry from outside, the problem will be most acute on the *south bank*, since the general manufacturing base is weak. With better communications in prospect the Area's attractiveness to industry will be enhanced. But without more positive government initiative than the usual industrial development certificate treatment accorded to new towns outside Development Areas, it would be unlikely to attract much general industry. Bridging the Humber will make a substantial difference, because it will give to any manufacturer on the south bank access to a much wider range of commercial services, specialist engineering firms and a larger pool of skilled labour. But this will not be enough of itself to achieve the transformation of the Area which is necessary for a major expansion of general manufacturing industry. Industrialists moving to the Area would be even more conscious than those already there of its distance from the main markets of the country. They would also be aware that its specialist services are incomplete by comparison with such areas as the South East, where a very wide range is within easy reach. On the basis only of *spontaneous* acceleration in the growth of manufacturing industry, the prospects would hardly justify even a single new town on the south bank, let alone the new city in the area which we have suggested in para. 4.56.

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* See footnote on p. 88.

5.31. But this looks at the problem in far too narrow terms. The question is not whether manufacturing employment in Humberside will expand naturally on a sufficient scale to attract an inflow of population, but whether, with full government commitment to a major plan of expansion and the appropriate administrative machinery to give reality to that commitment, the flow of industry could be sufficiently accelerated to give employment to the population occupying the new housing. Such a commitment by the Government would be ineffective in an area with marked disadvantages for industry, but Humberside's many environmental advantages—the absence of unsightly relics of past industrialism, its major ports, large scope for physical expansion and good industrial sites—should make it a physically attractive area for industrialists considering a move. A vigorous development agency should be able to interest industrialists in the Area, to meet their needs for physical facilities, public services, etc., and help them overcome the problems of moving their factories. The Area, moreover, as Chapter 4 shows, lends itself to forms of physical planning which, in skilful hands, could give it the reputation of being a modern progressive city region with all the facilities for a good life in more spacious and attractive conditions than elsewhere. Planning on a very big scale should also enable the agency to attract some very large employers of labour who might bring their own office employment and research workers with them, thus improving the balance of employment opportunities.

5.32. The Area will continue to suffer from one major location disadvantage however—its distance from the main sources of new industrial investment. Proximity to the markets and the services of London, and the relatively short distance from their original homes, have been important in the success of new towns around London, while the difficulty in attracting industry to some Development Areas has in part been due to the long distance that firms would have to move from the major congested areas of London, Birmingham and south Lancashire. It is a particular drawback of Humberside that it seems unlikely that the West Riding will be generating any substantial demand for the dispersal of its industry, given that area's present dependence on industries with limited prospects for expansion and the absence of severe physical constraints on expansion eastwards from the existing urban areas.

5.33. If Humberside has to compete for general manufacturing industry with parts of the country which are in closer economic and physical relationship with the main existing centres there could be a decided tendency for industrialists to prefer the latter on the grounds that they would be nearer the economic heart of the country and would find any move less disruptive. This would not prevent the location in Humberside of heavy industry of the kinds which have grown there recently; but it could seriously limit the inflow of engineering and allied activities.

5.34. Studies of the factors that influence business location decisions show that much mobile industry is attracted by the prospect that in a new area it will be able to obtain the labour it requires without bidding up wages. This is partly a matter of the availability of trained or trainable reserves of labour. In new town programmes to date some of the labour has been provided by firms bringing key workers with them, while other workers have come from housing lists of exporting authorities or have been attracted because housing at a tolerable price was not readily obtainable within the major conurbations. It is difficult to foresee what the national housing outlook will be in the 1980s or the 1990s, but it is doubtful whether the availability of a house will make new towns quite so attractive as in the past 20 years. Other factors will tend to determine whether skilled or easily trainable labour would move to a new location. The distance of Humberside from the main areas of population pressure will discourage people from moving there. It is however probable that as time passes personal mobility—particularly of the young—will increase so that 50 or 100 miles will no longer seem a great distance to move, and a new environment, as long as it offers all the facilities of a modern city region could be more attractive than the older centres. But other major new centres nearer the main urban complexes would always have some advantages.

5.35. Indeed Humberside's prospects for stimulating local industrial development and attracting industry from outside depend to an appreciable extent on the strength of the competition from other areas. Although it is expected that the problems of much of the present Development Areas should be solved by the early 1980s the slow rate of economic growth of other areas of the country is already giving cause for concern and is being studied by the Hunt Committee. Problems of industrial decay will continue to arise with the result that some part of the national supply of mobile industry will have to be allocated to them for many years to come. These demands should however be less than they are today, while the total supply of mobile industry may well be greater. Moreover experience with differential investment grants and regional employment premiums may by then have shown that it is possible to rely for the alleviation of such areas' problems more on the encouragement of faster growth in industry already there, rather than on the attraction of mobile industry from elsewhere. Some mobile industry would therefore certainly be available by then for new towns and cities. Many of the existing new towns and town expansions will still be growing in the 1980s and Humberside is unlikely to be the only fresh area designated for growth; the competition for mobile industry could therefore still be strong. Viewed in relation to other possible locations Humberside would undoubtedly be more attractive to industry on the move than areas of structural industrial decline, and more likely to grow successfully than those with a smaller industrial base or further from the main centres. On the other hand it would be more difficult to initiate industrial development on Humberside than in those locations which are closer to the main centres of population and the country's communications network, or which have a larger industrial base and are already showing signs of vigorous internal growth.

Conclusion

5.36. This analysis shows that a very substantial increase in ordinary industrial employment would be both essential and difficult to achieve—even allowing for the fact that the provision of services for the increased population in the Area would in itself generate a major part of the employment needed and for some continued growth of employment in industries likely to develop on Humberside because of its particular locational attractions. The Area, particularly Hull, already has a general manufacturing base—without which the prospects of growth would be much worse—but there is not in prospect as yet a broad enough diversification of industry or an internal dynamism of economic growth for there to be any certainty that the necessary increase in employment could be easily achieved. Much would depend on the quality of the physical planning of new development and on the drive which the development agency for the Area puts into attracting new industry and meeting its needs. But we have concluded that to be sure of success these efforts would have to be supplemented by financial inducements to industry. The size and extent of these inducements cannot be firmly defined at this stage, since they would depend upon the general economic situation and the demand for mobile industry for other purposes at the time that growth in the Area takes place. It seems very probable that to initiate the large and rapid expansion which would be necessary for the large schemes we have examined, there would have to be financial inducements for general manufacturing industry to move into the Area for at least the first five or ten years of growth. In this respect the Area is probably no different from others which might be chosen for such large-scale development and which are equally clear of the main congested areas. We think it will not be necessary to encourage the bulk processing industries to move to Humberside by offering them inducements biased towards capital intensiveness or inducements specially designed to attract them—as some people might advocate in view of the appropriateness of bulk processing to the Area—because those industries are likely to go there anyway provided there is no financial discrimination against them (see para. 5.19).

5.37. The initial impetus from the inducements might prove to be sufficient, but in the particular circumstances of Humberside self-sustaining growth might not be reached very quickly. There is a risk that it would be necessary to maintain them for a long period and possibly also to add inducements to industry already there to encourage additional expansion. Once substantial population growth in the Area had started, to slow down would involve very serious waste of committed resources, so that the Government would have to be prepared to maintain the financial inducements for whatever period was needed to ensure success. We have no doubt that eventually a moderate level of inducements would prove successful and that the end result should be an area with a large, well-diversified and dynamic economy able to maintain its competitive position without special assistance.

5.38. The uncertainty of the required scale and duration of incentives might appear to give grounds for the adoption of the minimum rather than the maximum alternative—or even a less ambitious scheme still. But such a decision would not necessarily be in the national interest, which must lie with a plan to house our extra population in a way that will give best returns on the money spent. In a less ambitious scheme some of the main advantages in employment would be missing. In particular our view that service employment should at least rise *pari passu* with population (see para. 5.15) depends on the upgrading of the whole Humberside sub-region, and of Hull in particular, towards a higher order in the provision of services. Similarly with a less ambitious scheme, particularly if there were no long-term assurance of continuous expansion, construction firms would be unlikely to rely so much on local labour or to embark on the expansion of their resources that would achieve low construction costs. For a scheme of any appreciable size Humberside's present employment base will have to be substantially diversified, particularly in respect of engineering. The bigger the scheme the sooner a wide variety of industry would be established and thus the quicker self-sustaining growth would be reached. The financial incentives would probably not have to be at the same rate per unit of installed capacity for a large scheme as a small one, because a firm government commitment to a large scheme with the concentration of public effort to make it a success which this would imply should, in itself, be an attraction to incoming industry. Moreover external economies of scale would arise more quickly. Spreading the population in a number of smaller schemes over the country as a whole might appear to be reducing the risk of failure, but might well postpone the date at which any particular scheme would become self-sustaining.

6 THE COST OF DEVELOPMENT

6.1. A decision to adopt Humberside as a major growth area for population would constitute a commitment to one of the largest geographical concentrations of public investment ever envisaged. Large-scale urban development to present-day standards typically involves capital investment of between £2,000 and £2,500 per person, including provision of houses, urban services, town roads, factories and offices. Large fluctuations between and even above these limits are possible depending upon the quality of the development and upon such other factors as the predominant type of industry. At present prices total investment, public and private, for the maximum scheme we have envisaged (i.e. an intake of 750,000 people) would be likely to be of the order of £1,800 million-£2,000 million spread over a period of 25 years.

6.2. Most of this investment is unavoidable. If houses are not built on Humberside for our extra population they will have to be built somewhere else; if industry does not invest in Humberside it will invest somewhere else. Thus it is not the total cost of investment on Humberside which is most significant, but those elements of cost which are likely to very from one location to another—the differential costs. In principle the differential benefits should also be studied—the extent to which Humberside would be a better place for people to live and a more efficient place for industry and commerce to operate than alternative sites. Moreover the primary benefit of a Humberside scheme may be to relieve pressure on existing major centres of population, thus contributing substantially to the welfare of those who live and work there. All these benefits cannot, however, be assessed even in qualitative terms, since they would vary greatly from location to location and involve difficult subjective judgments. This Chapter therefore concentrates on the cost elements.

6.3. To obtain a measure of the differential costs of adopting Humberside in preference to other places as a major population centre it would be necessary to define the other places with which Humberside should be compared. One possibility would be to compare Humberside with alternative locations that appear to offer similar physical possibilities and amenities. Information is, however, not so far forthcoming on other possible areas, so it is not practicable to make comparisons of this kind. We have therefore chosen the concept of comparison with a theoretical 'minimum cost' site by which we mean a notional area where each of the possible elements of cost is as low as anywhere in Britain. In practice, of course, no one area would have minimum costs in respect of all the factors involved in development. Such a comparison does not indicate the relative merits of Humberside against alternative locations, but it does show the order and importance of particular physical and economic difficulties that have been identified, and will permit a comparison as and when estimates are made for other locations on the same basis.

6.4. The choices are, however, not necessarily between a major planned expansion on Humberside and a major planned expansion elsewhere; but whether to establish new centres each of which separately would be on a greater scale than those so far attempted, or to continue with new town or town expansions on a smaller scale, or to permit greater growth in and around the present major conurbations. There are no adequate measures for the costs and benefits of relieving urban congestion. Therefore in considering the merits of a new growth centre as against the whole range of alternatives, qualitative assessments will have to be made for many of the relevant factors and an analysis of costs cannot be used as the sole basis for taking a decision on the adoption of Humberside as a major growth area. This is not just because of the uncertainty of many of the cost elements considered in this Chapter, but also because knowledge of the economics of location of people and industry is insufficient for full assessment of the major indirect and social costs and benefits which are probably those that should, ideally, determine the final decision.

Costs of construction

The value of land

6.5. The bill for constructing Humberside will consist of two elements, payments for the land used and payments for the work of construction. The price of land for development varies enormously, sometimes containing a large scarcity value element and at others understating its long-term resource value. Market prices are important in the accounts of the agencies responsible for any development, but they are not always a good measure of the cost to the nation of using the land for a new purpose. One measure of the resource cost of land intended for development or redevelopment is the capitalised value of the net output obtainable from the most likely alternative use to that of the development under consideration. In the case of Humberside this alternative use is likely to remain in most parts of the Area the existing use.

6.6. The most important existing and potential alternative uses are agriculture, mining and quarrying, industry, commerce and recreation. In the case of Humberside the last four uses can be ignored, provided urban development is planned to avoid any significant encroachment on the sites which are important for these purposes.

6.7. Large-scale development of Humberside must absorb areas of agricultural land and this constitutes a definite loss. Agricultural output and the resource value of farmland vary according to soil quality, climate, farm capital, distance from markets, etc. These can be assessed, but there is serious disagreement among agricultural economists about the underlying basis for converting current value of this output to a capital valuation. It is considered by some that converting current value to capital cost by normal discount rates of, say, 8 per cent gives much too low a valuation because:

- *a* as men will continue to use land extensively for food production for the foreseeable future, land is an everlasting asset;
- *b* the long-term net output from agricultural land should be capable of continuous improvement by new farming techniques;
- *c* increasing world population may cause food prices to rise relative to the general price level.

6.8. The ability to increase output over time is most marked where there is a favourable combination of soil quality, climate, gentle topography and efficient farming organisation such as exists on Humberside. There the grade I and grade II areas afford the agricultural industry exceptional flexibility for keeping abreast of techniques and changes in market demands, and argument *b* undoubtedly applies. The net output of top-grade arable farmland in 1964-65 was about £18 per acre, including subsidies. If it is assumed that net output can be increased by 1 per cent per annum to allow for point *b* and that the price of agricultural products will rise 2 per cent per annum relative to other goods and services to allow for point *c*, then the valuation of such land would be about £480 per acre—calculated on the basis of a 26-year purchase at 8 per cent. For comparison present prices of first-class agricultural land on Humberside are about £400 per acre. The alternative to building on the good land on Humberside might be to use very poor land with a resource cost of, say, £100 per acre (i.e. ignoring barren hill-tops, etc., of no value since building could not conceivably take place there). At an overall urban density of 22 persons per acre these variations in the value of agricultural land selected for development would affect development costs by up to £20 per head.

6.9. Sites along the Humber estuary are uniquely suited to large raw material processing industries. If such industries were to be sited away from deep water they would be far less economic. The investment involved would be of the order of many tens of thousands of pounds and differences in agricultural quality would represent a very small proportion of such expenditure. This would apply also to the urban areas needed to sustain these projects. As an example, for a housing estate to serve south bank industrial plants the capitalised costs of the increased journeys to work as a result of building on grade III land south of Brigg instead of building on grade II land at Keelby would be much greater than the capitalised value of the difference in lost agricultural output.

6.10. The land needed for all purposes for our maximum scheme could be no more than about 43,000 acres so that on the basis described above the total extra cost in terms of lost agricultural output as against the minimum cost site would be £12 million. Thus unless the allowance we have made for the special considerations which affect agriculture referred to in para. 6.7 are much too low—and it can be argued that they are too high—the extra costs of using this good quality land is of the same order of magnitude as some of the other differential costs considered in this Chapter.

Construction difficulties

6.11. The Humberside Area has few topographic characteristics that might give rise to added construction costs. Gradients are generally gentle and the subsoil is satisfactory both for housing and for heavy industry. Housing costs at present are lower than in many areas of the country and although this is to a considerable extent due to the relatively low costs of land and labour there seem to be grounds for assuming that construction costs on Humberside may already be below average owing to its topographical advantages. For road construction the low gradients, the sparse population and easy lie of the routes likely to be needed should make costs among the lowest in the country.

6.12. We have considered whether the low-lying nature of the Area would involve extra works for sewerage—particularly surface drainage. Theoretically the capital costs of creating a complete new sewerage system, including foul sewerage, surface water drainage and the provision of facilities for sewage treatment, ought to lie between £1,000 per acre in ideal conditions where soakaways are being used for disposal of storm water to £4,000 per acre in very adverse circumstances. It is impossible to assess sewerage cost with any precision in advance of detailed planning. Preliminary examination of possible drainage arrangements described in Chapter 9 suggests that costs on some sites would be exceptionally low (especially if the proposal in Chapter 9 for disposal of rainwater into soakaways proved feasible), while others would be considerably above average. Certainly sewerage costs per acre on Humberside overall will be above those of a notional minimum cost site where costs nowhere exceed £1,000 per acre, but it is not possible in advance of more detailed work to say by how much. No figure for differential costs on Humberside is therefore put forward. It will be equally impossible to assess sewerage costs for any other area of comparable size which might be considered for major growth in advance of detailed planning, so that sewerage costs although important cannot be properly taken into account in comparing different major sites.

6.13. A preliminary view of the Water Resources Board regarding the costs of water supply is that these are not likely to differ materially from the cost of new supplies in, say, south-east England though they could well be higher than costs in parts of the west coast. Water is a relatively low-priced commodity in Britain and except for some large water-using industries its cost is unlikely to be a significant determinant in locating urban development. Any price differential reflecting the additional capital and maintenance costs of providing water would be of the order of 6d.-1s. per 1,000 gallons. The capitalised value of this additional running cost is £10 million-£20 million.

6.14. Humberside is relatively free of the remnants of earlier industrial activity. Dereliction in the major areas chosen for development, including Hull, is limited and there are few existing encumbrances or assets on the land that would have to be removed. The area north of Scunthorpe where iron ore mining has left considerable dereliction is one exception. Leconfield Airport if it were developed would raise the problem of the value to be put on the existing asset—a military airport—but this site is not considered essential in the development of Humberside. Similarly war damage cleared large areas of central Hull and the necessary redevelopment to expand its central area facilities should with careful future planning involve only small extra resource costs to deal with major population growth. Compared with many alternative locations, especially where growth of existing conurbations is involved, this could make attractive development on Humberside relatively very cheap.

6.16. The only other physical factor that will substantially add to the cost of development is the divisive effect of the Humber estuary. The arguments in paras. 4.97 to 4.116 suggest that at most it is only the very uncertain cost of bringing the building of a first Humber bridge forward to 1976 which should be counted as a cost of planned development on Humberside, since the bridge itself would be needed in the absence of planned development. But the difficulty of crossing the Humber will constitute an extra cost of planned development on Humberside in the longer term. It may be that new techniques of river crossing, such as hovercraft, will reduce such cost at least for the movement of people, but planned development would eventually create a demand for a second fixed crossing, the timing depending on the location and extent of development on the south bank. Preliminary indications are that some serious physical difficulties would have to be overcome and that the cost might be £20 million-£30 million at present prices (see para. 4.96). Nor does this constitute the full cost of locating development astride such a major estuary in contrast to location in an area with much greater internal accessibility. Journeys within Humberside will inevitably be longer and fewer than in such an area. This implies a loss of benefit rather than an additional cost of production, but some higher costs may well be involved, for example in the longer journeys that may have to be made by construction firms. These lost benefits and additional costs would have an effect on the attractiveness and overall competitiveness of the Area; but against this must be set the advantages deriving from the estuarial setting—the proximity of the port and the excellence of sites for industry. The balance between extra costs and benefits in this respect seems likely to be quite small.

6.16. Other potential sites for a major growth centre would presumably also have identifiable extra costs deriving from disadvantages of terrain. Without comparative data these cannot be assessed in quantitative terms; but it is our impression that several potential areas would have more identifiable items of excess terrain cost. Comparison with existing urbanised areas would be less reliable because there the costs of clearance (e.g. in respect of new road arteries) would have to be offset against the benefits accruing from fuller use of existing structures.

Efficiency in construction

6.17. The scale of development envisaged for a new growth area would call for construction activity far beyond that attempted in any new town to date. The maximum rate of 12,000 houses a year is over six times as high as anything that has been achieved in any new town.* Perhaps the only comparable effort is that of the Greater London Council which encounters particular difficulties in so far as much of its building takes place in already urbanised areas. In consequence it is difficult to make comparisons which would suggest the likely economies of scale that could be achieved on Humberside.

6.18. Despite the more thorough organisation possible with industrial building compared with traditional methods, costs are higher. But the costs of the two types are converging and it seems likely that within the next 16 years they will become comparable, certainly on large projects. Proper planning of operations is necessary for efficiency in industrial building and present evidence suggests that stability and continuity are more important than scale of operation—at least above a certain minimum level. Nevertheless some allowance should be made for the extra efficiency of very large-scale operations. If it were only a 2 per cent reduction in the average cost of construction this would amount to a saving of about £20 million in the maximum case. This saving might arise in any major development on this scale, but Humberside's exceptionally sparse population and wide areas of flat land should give the Area a particular advantage. Certainly development within or near existing urbanised areas which has to be organised on many small sites could not yield similar economies. Further savings in cost on Humberside might be obtained by making full use of district heating and possibly heat pump techniques. The major developments on 'green field' sites which are possible in the Area would provide a rare opportunity for introducing such arrangements in a systematic way. These possibilities should be further investigated in consultation with the energy-supplying authorities. The resulting cost advantages should however be offset against the somewhat higher cost of domestic heating in this Area compared with the south of the country.

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* Harlow, 1954, dwellings completed = 1,960.

Costs of assistance to industry

6.19. In Humberside as in all new towns part of the cost of industrial development would fall on the public purse. For the main estuarial sites the public sector would only have to meet the costs of the main public utilities, but for non-estuarial sites substantial investment in factory buildings in advance of definite commitments by industrialists might be required. The financial cost is primarily the risk that the buildings would remain unoccupied for some time depending on the success of the whole Humberside expansion. If the scheme were successful these costs could be recouped from industry once it had become properly established—as has been the case in all new towns to date.

6.20. Costs incurred in offering inducements to industry to move to or expand in Humberside are of more significance. In Chapter 5 we concluded that sufficient employment opportunities to support a major growth of population in the Humberside Area could only be achieved by financial inducements to industry. Substantial inducements would certainly be needed to get industry to migrate to the Area in at least the first five or ten years of growth. This initial impetus might be sufficient, but there is a risk that it would be necessary to maintain the inducements for a longer period and possibly also to add inducements to industry already there to encourage expansion. The scale of the payments to firms setting up or operating in Humberside would be linked to the level of assistance still required in the 1980s and 1990s to stimulate economic development in any areas akin to the present Development Areas.

6.21. If the main current inducements offered to industry in Development Areas were required throughout the build-up period on Humberside the total cost for the maximum scheme would be about £400 million. This cost is made up of payments of Regional Employment Premium and Selective Employment Tax premium at current rates for workers both in existing and incoming manufacturing industry, together with the 20 per cent differential payment of investment grant (not the whole payment) for investment in plant and machinery, which would also have to be paid both to incoming and resident industry. But by the early 1980s the national situation will have changed. The report of the Hunt Committee may well have initiated new approaches to assistance to industry in various parts of the country, while the problems of some of the present Development Areas should have been largely solved. Whatever the level of assistance then in operation to Development Areas it is most unlikely that Humberside would need the full amount for the whole period of build-up. These are complex problems, but on such information as we have at present about these factors, we believe that the maximum sum to stimulate massive industrial growth on Humberside, starting in 1980, would be no more than one-quarter of the £400 million figure given above and even that estimate is based on giving all the present forms of assistance both to incoming and local industry, at reduced rates, for the whole of the build-up period. Higher rates for a shorter period or for incoming industry only would cost much the same and might achieve much the same growth rates. However, self-sustaining growth should be reached in the Humberside Area well before the end of the build-up, certainly before two-thirds of the period has elapsed, in which case the maximum cost would be no more than about £65 million.

6.22 The lowest cost would be incurred if all that was required were payments over the first ten years of major build-up to encourage industry to move to the Area. Assuming this took the form of investment grants at a 10 per cent differential for ten years and that for administrative reasons they had to be paid both to incoming and existing firms on Humberside the cost would be £25 million. This minimum cost might well be incurred in the initial stages of other large-scale developments. However there might be certain particularly favourable sites where relaxation of industrial development certificate control would be sufficient without any financial inducements, so that we have assumed, for comparison, the cost of incentives to industry in the 'notional minimum cost' site to be zero.

6.23. These are gross Exchequer costs and the net costs to the Exchequer allowing for taxation effects would be considerably lower. The net cost would be between £15 million and £40 million at present tax rates.

6.24. Furthermore the resource costs would be much lower than even the net Exchequer costs. The Exchequer costs reflect the rate of favourable treatment thought necessary to induce employment to grow at the required speed. That rate if accurately assessed is the one necessary to induce the marginal firm (i.e. the most reluctant firm) to move to the area or for the marginal firm already there to expand. For the marginal firm the payment represents the maximum use of resources that could be involved; for other firms induced to move or expand the real resources used will necessarily be less. Much of the Exchequer cost should thus be regarded as transfer payments to the recipient firms and their employees not involving any corresponding use of resources.

6.25. Another way of looking at the resource costs is the following. Opening up a new plant in a new location such as Humberside involves real costs in several ways—apart from buildings and machinery there are expenses arising from the physical travel of workers or plant from the old location, training costs, the cost of low productivity in the initial period, etc. Similar types of costs arise in any industrial development in a new location and many of them in any extension *in situ*. We know little about all these costs other than that they vary considerably from one case to another. Some firms quickly get into their stride at a new location; others take years to achieve normal efficiency. But it seems probable that the variation in these real costs between one location and another is small relative to the total real costs associated with opening new plant.

6.26. A further consideration which in principle should enter into any assessment of Humberside in relation to many existing urban complexes would be the gain which might arise to industrial production in other parts of the country from a reduction in traffic congestion and the consequential increase in the operating efficiency of the towns concerned. Whatever the weight of such considerations they do not enter into the cost comparison attempted here, which is one relative to a hypothetical minimum cost site free of congestion disadvantages.

Significance of scale of development

6.27. The figures in this Chapter are based on the maximum scale of expansion. Some of these costs would vary according to the scale of expansion adopted, but it seems likely that for certain items there would be an element of fixed cost which would apply at any point within the range of schemes considered. Thus the costs of a second Humber crossing should probably be regarded as a fixed element. The costs of inducement to industry would not vary in direct proportion with the scale of incoming population, as an initial period of relatively high payment to existing as well as incoming industry to provide a 'boost' to the area would in any case be required.

Total differential costs

6.28. The differential costs identified in this Chapter are those over and above a 'notional minimum cost' site. On this basis the additional costs involved in developing Humberside, which we have been able to identify and which are itemised below, seem likely to be of the order of £60 million-£100 million. The range depends on whether relatively favourable or unfavourable assumptions are made about the items which we have attempted to quantify· agriculture, water supply, estuary crossing and inducements to industry.

Differential Costs	*Unfavourable £ million*	*Favourable £ million*
Agricultural land	12	12
Additional water supply costs	20	10
Second crossing	30	20
inducements to industrialists	40*	15*
	102	57

6.29. These costs represent between 3 per cent and 6 per cent of the total capital cost of development on Humberside (for the maximum scheme) and would be a much smaller percentage of the combined capital and running costs of the development. Even allowing for the major element of uncertainty in any calculations of this type, excess costs above a notional minimum cost site would not be great enough to rule out development on Humberside. Major development on any other site would also involve substantial costs above the theoretical minimum, and although detailed information is not available they may well be of similar orders of magnitude. Even where Humberside's costs may be higher than some alternative locations, the difference might be substantially offset by lower construction costs for roads and housing and lower resource costs for items such as energy supply.

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* These figures allow for recoupment by taxation but actual resource costs would be lower (see para. 6.24).

7 IMPLEMENTATION OF LARGE-SCALE DEVELOPMENT

7.1. The new developments considered in this Study are far bigger than any so far carried out in this country. The maximum scheme would settle more people in the Area than the total housed in new town and town expansion schemes since the second world war (750,000 people involving 36 different projects). Even under the minimum scheme the increase would be more than half that size. The highest rate of intake for the maximum scheme—35,000 people a year—is not far short of the highest annual rate of planned outflow from London ever achieved, and it would have to be maintained for a long time. The London programme has been based on one authority experienced in exporting people and jobs to a number of reception areas, whereas on Humberside there would be a wide area for reception and a large number of possible sources of population (see para. 2.17 *et seq.*). To be successful, large-scale development on Humberside would have to be based on an exceptionally large-scale overall plan covering most of the Area, with vigorous efforts undertaken to make the whole city region attractive to people and industries. There would therefore be many organisational problems.

Physical problems

7.2. For our maximum scheme, the rate of house construction would have to rise to about 10,000 a year in the first ten years and probably 12,000 in the second to meet the needs of newcomers alone. In addition existing housing will have to be replaced as it grows older and homes will be needed for the growing local population, requiring altogether a further 6,000 houses per annum during the 1980s and 1990s. In the early stages many of the houses for the migrants would have to be built for letting. However the growing desire for home ownership and the need to attract a high proportion of skilled workers and technically and professionally qualified people would make it desirable to allocate an increasing number of the sites for building houses for sale.

7.3. Experience suggests that most of the new arrivals would want a three-bedroom house first, but as time goes by, although the children who marry and leave home may want a similar house, uniform building to one size could result in waste of space. Accordingly maximum mobility within the Area would have to be encouraged with the interchange of houses to meet family size requirements; it might be necessary to leave vacant spaces for smaller houses to be built later. These problems might be easier to solve in a major development in which there would be continuous house building for a very long time, since later building schemes could be adjusted to meet the changing needs of the inhabitants.

7.4. The lack of physical planning constraints and the number of houses that would be needed mean that new building techniques could be used on a scale not so far attempted. The Yorkshire and Humberside Region is well advanced in these techniques; industrial building methods account for over 40 per cent of local authority housing completions and there are already 13 firms experienced in industrialised building operating in the Region; several are located within the Area. A substantial expansion in output should be possible and the introduction of new techniques giving further economies and higher quality is probable. But building vast numbers of houses by industrialised methods could produce extensive areas of uniform housing with little to relieve the monotony. Skilful design and layout could help to prevent this and the very scale of the development should make it easier to produce a wide variety of designs while still obtaining the cost advantages of long runs and standardisation.

7.5. Current output from the building industry on Humberside is about 6,000 houses a year. This would have to be tripled for our maximum scheme, and many more roads, public utilities, schools, factories and major industrial plant would also have to be built. In view of these needs employment in construction would be likely to rise to 11-12 per cent of total employment during the peak period, requiring 30,000-40,000 more construction workers than at present. It is the custom with large building projects to bring in labour from outside and this would no doubt happen on Humberside. There is however scope for a major increase in the permanent labour force because much of this rebuilding of the Area's large numbers of sub-standard dwellings could be concentrated, if the appropriate plans were made in the 1970s (see para. 9.73). This would necessitate an increased number of building workers who would then be available for the major new development in the 1980s. Thus work for an expanded labour force could be provided for 30 years or more, which would encourage the workers to settle permanently in the Area, possibly becoming the first inhabitants of the new development.

7.6. The Area is already well placed for supplies of energy—with coal from the central coalfields, natural gas landing at Easington, oil refineries on the south bank, modern large power stations to the west and south (see paras. 9.33-9.37). If more electricity is needed the Central Electricity Generating Board has a major site at Killingholme. No problem of energy supplies should therefore arise.

Economic problems

7.7. Chapter 5 sets out the problems of providing enough employment in the Area to attract people to it in large numbers. The Area would have to gain a reputation among workers as a place where well-paid work could readily be obtained and among industrialists as a place having a plentiful supply of highly skilled labour. This would take time and in the early stages of growth enough people might not arrive to fill the houses because of lack of jobs. Since it takes at least two years for a manufacturing firm to move to a new site after it has decided to do so, the housing programme might on occasions result in large numbers of houses remaining empty for substantial periods. This problem would not be proportionately greater for a large scheme than a small one, but the actual numbers of empty houses in a big scheme would be all too likely to attract publicity and might seriously jeopardise the reputation of the project. To avoid this it is essential that the Area's economy should be moving forward vigorously at the start of major development and should be further stimulated as necessary during growth. Employment opportunities would need to be carefully planned in advance. Even so some degree of imbalance would be inevitable from time to time: the problem would be to ensure that these phases were as short in time and as small in scale as possible.

7.8. Not all industrial projects introduced into the Area would be successful and with the rapid technological change which is likely during the rest of the century demand for new skills would be constantly arising. Accordingly there should be ample retraining facilities and every effort made to ensure that the labour force would be adaptable to change as well as highly skilled.

Social problems

7.9. In their early stages the new towns have not been out of scale with neighbouring towns and villages, and the initial social problems have been mainly those of assimilation. In the case of a major development on Humberside although some growth would be close to the existing larger communities, most would be on 'green field' sites with only small villages nearby, where social facilities would be quickly swamped. Thus these developments would have to depend much more on their own resources to mitigate boredom and discontent in the new arrivals. The residential areas would have to be particularly attractive to live in, and the industrial areas attractive to work in. Social and recreational facilities would have to be provided at an earlier stage than has been normal in the past, and the rents charged for property for these purposes might have to allow for initial losses which could be recouped later.

7.10. The best pattern of social facilities—the location of meeting places, recreation areas, etc.—could be difficult to assess for a large scheme. The early new towns planned generous neighbourhood social provisions for 5,000-10,000 people; but experience has shown that there is a marked tendency for many social groups, even though small in size, to evolve on a town basis and to choose a town centre as their meeting place. In a large scheme it seems likely that social facilities should be provided on a basis of units of 40,000-50,000 people, but this requires further investigation in which the particular form of urban development finally adopted would be important.

7.11. In the early stages of new towns social activities tend to be at a low ebb because the families are preoccupied with young children. Nevertheless a large scheme should make more expensive and more elaborate social facilities profitable much sooner than in the early new towns. Theatres, art galleries, large sports stadia and swimming pools might all be required before the scheme was ten years old. But the needs might have to be examined over an area much wider than that of the development itself, since new development, once successfully launched, creates its own sphere of influence. The improved road communications which would accompany large-scale development could accentuate this trend.

7.12. Age distribution in the early stages of the existing new towns has been very different from the national pattern; few people over 40 and less then 3 per cent over 60. In a very large 'green field' development a highly distorted age structure of this kind would lead to social and planning problems which ought if possible to be reduced. More houses for sale and the building of houses for old people would have some effect. More could be achieved by deliberate efforts to create a centre of office employment in the Area (see para. 5.13). Nevertheless the ages of the incoming population would be likely to remain broadly similar to the past new town pattern, since it will always be the young who are most willing to move. This has been assumed in the population projections of para. 2.18.

7.13. This unusual age structure has consequential effects on housing, educational facilities and 'second generation' employment, all of which need to be taken into account in the forward planning of large-scale development. The nature of this effect on housing has been considered in para. 7.3.

7.14. There will be a heavy demand for primary school places in the early stages, followed by a demand for secondary schools and later for further education facilities. In the past these demands have over-taxed the resources of the education authorities, and the problem will become more intractable with a larger scheme; it could well be that the new educational construction required by a population intake of 300,000 in 15 years could exceed those of a large county. Flexibility would be needed to reduce the risk of building too many schools to serve any particular estate, e.g. by the exchange of houses and the later construction of smaller houses.

7.15. Although experience suggests that comparatively few of the new arrivals would be in the 15-19 age group, the economic programme would have to provide employment for that group within five to ten years of the start of development, and in due course for the children of second generation families. The scale of provision for school leavers in a planned intake of 300,000 would have to be far greater than anything in the past and would in itself provide a problem as large as that of total employment in an earlier new town. A wide variety of jobs, including services and office employment, would have to be created at the right time.

Administrative problems

7.16. Problems in planning and controlling the intake of a large population would be considerable. The capital cost of the maximum scheme we have considered would be at least £1,800 million, which would be the greatest concentration of resources on a single planning operation ever attempted in one part of this country. Costs would have to be carefully controlled, although the large scale would provide the opportunity to apply the latest management techniques including cost/benefit analysis, operational research, critical path analysis, etc. The master plan would involve the co-ordination of many physical and economic components over a very wide geographical area and would need to include housing, industry, communications, central area facilities, schools, and entertainment. Techniques for computerised planning would have to be used and further developed. The social problems referred to in paragraphs 7.9 *et seq*. would need careful attention. The plans would have to be flexible enough to accommodate major social and technological changes and take account of a wide range of regional and national considerations.

7.17. Since people would have to be attracted to the Area over long distances by the quality of the living standards and the prospects of well paid jobs, the plans would have to produce an exceptionally attractive community for all types and qualities of people. The problems of economic growth considered in Chapter 5 would also call for exceptionally vigorous measures to attract manufacturing industry. The size of the project would both justify the recruitment for the planning work of the best brains available in a wide range of disciplines and attract them by its challenge. The new arrivals would have to be housed in several widely dispersed major sites throughout the Area, so that development would have to blend with the plans of existing communities to produce a viable city region.

7.18. Greater powers than are usually given to a new town corporation would almost certainly be needed. The New Towns Acts relieve the local authorities of the burden of general administration, housing, estate roads and residential, industrial and commercial management over the designated area, but leave the responsibility for education, highways, major sewerage and most other services where they normally lie. This would hardly be practicable for a much larger scheme for financial reasons alone, since the local authorities could not provide education and other services for new arrivals more numerous than their existing population under the normal financial arrangements between central and local government. Moreover the planning of highways, main sewerage and other infrastructure over a wide area would have to be part of the basic planning work. The project is in fact likely to be successful only if all the main tasks of planning, physical construction and encouragement of employment growth are given to a single well-staffed authority or agency. The question of the exact powers of such a body and its relationship with other authorities in the Area is complicated and would need settling before any decision in favour of planned development could be taken. We have referred in this report to the necessary corporate body as the 'agency' or the 'planning and development agency', but without intent to prejudge its eventual status or composition. Even before such a body is set up further research and planning work on many of the issues identified in this Chapter is desirable.

7.19. This Chapter mainly examines those problems which arise from the very large scale of the project rather than from the nature of Humberside or its location. Nevertheless there are aspects which are special to Humberside. Its relative remoteness is a disadvantage; the proposed total number of migrants is a higher proportion of the existing population than might occur on other sites, requiring greater provision of shopping and social facilities in the early stages; its distance from the likely sources of migrants and industry make it particularly important that the Area should be made an attractive place for people and industry, which reinforces the need for planning of a very high quality. On the other hand these factors are amply offset by the unusual freedom from physical planning constraints within the Area, which will leave the agency freer to devote much more time to overcoming the problems of large-scale rapid growth than would be the case on a more complicated site. Given a highly skilled organisation with wide powers to plan and execute the project, the results should eventually be highly successful.

8 CONCLUSIONS AND RECOMMENDATIONS

Arguments for and against major development

8.1. Planned development on Humberside to accommodate the very large inflow of population by the year 2000 which we were asked to examine would have to continue throughout the 1980s and 1990s. By that time the planned movement of people will probably be based less on formal overspill schemes and more on voluntary migration; consequently, if Humberside is to attract large numbers of people, it must be able to provide them with good living conditions and well-paid jobs. It is with these two basic requirements in mind that we list the main arguments for and against major development on Humberside.

8.2. In favour are:

i there is an ample supply of land which would be easy to develop, enough to provide sites in attractive surroundings for perhaps two million extra people; (para. 4.54)

ii these sites are mostly grouped in large areas with few planning constraints, thus simplifying the planning of large communities and permitting large-scale house construction at low cost; (paras. 4.39 and 7.4)

iii land suitable for major industrial development is plentiful, including sites near deep water which could be used for installing large bulk processing industries on the lines of the Maritime Industrial Development Area concept; (paras. 4.5, *et seq.*)

iv by the end of the 1970s the Area's road communications, both with the rest of the country and internally, should be generally good, with some spare capacity. Additional roads could be built and new transportation techniques introduced with fewer difficulties than in many areas; (paras. 4.77 and 4.84)

v Hull already has good sub-regional central area facilities with space for their expansion to meet the needs of new arrivals; the central areas of Grimsby and Scunthorpe will also have some spare capacity; (para. 4.2)

vi because of these physical planning advantages, allowing a wide choice of urban forms, very high quality development of the Area could be planned;

vii as regards economic potential the Area had between 1953 and 1967 a rate of employment growth well above the national average with a number of steadily expanding industries; (para. 5.2)

viii traffic handled by the major port complex of the Humber estuary should increase steadily as trade on the short sea routes to Europe expands; (para. 5.11).

8.3. The arguments against major development are:

i substantial acreages of high quality agricultural land would have to be used; (para. 4.52)

ii because the estuary divides the Area in two, communications will always be complicated even when a Humber bridge has been built, and a further crossing would eventually be needed; (para. 4.96)

iii despite the past rapid growth in employment the Area still has above average unemployment, below average incomes, and net outward migration. With present distribution of industry policies and the rapid local growth in population, future increases in employment are unlikely to be sufficient to relieve these conditions substantially during the 1970s; (para. 5.2)

iv although more bulk processing industries could readily be attracted to the Area such industries employ comparatively few people and the timing of their development is unpredictable; (para. 5.19)

v even when road communications have been improved the Area's distance from the country's main industrial centres will still leave it one of the more difficult places to which to attract people and industry; technological advances in transport should, in the long term, reduce this disadvantage; (paras. 4.86 and 5.32 *et seq.*)

vi the economy of the Area is not sufficiently buoyant to create the extra employment needed for a large new population, so that manufacturing industry would have to be attracted to the Area. In our view, because of its distance from the main industrial areas, the necessary large and rapid inflow of industry for a big scheme could only be achieved by offering financial inducements. These would probably have to be appreciable for the first five to ten years and there is a risk they might be needed for a much longer period; (paras. 5.36 and 5.37).

Assessment

8.4. Neither the arguments for, nor those against, major development on Humberside are overriding. The favourable arguments do not provide compelling reasons for going ahead regardless of the costs of alternatives; while those against do not rule the Area out completely. In Chapter 5 we reached the conclusions that to be economically successful planned population growth should be very large in scale, and the quality of living conditions provided would have to be especially attractive. In Chapter 4 we suggested that the best physical planning solution for large population growth, especially on South Humberside, would be mostly in new towns or cities, which to be successful would have to be planned from the beginning on a large scale. This is not, therefore, an area where a small scheme could be attempted first, to be followed if it proved successful by a larger one.

8.5. On the assumptions made in Chapter 6 about the likely extra costs of all the adverse factors in the Area, the costs of a very large development on Humberside (750,000 extra people) over 20 years would not be more than about £100 million above a hypothetical minimum cost site. This is only a small percentage of the total costs of the project of at least £1,800 million. The end result of going ahead on Humberside, on the scale we think necessary, would be a very fine city region, which could eventually pass the two million population mark, providing excellent living and working conditions in an attractive and healthy part of the country. A decision whether or not to proceed with major development should however have regard to a comparison of its costs and benefits with those of other ways of providing accommodation for 750,000 people. Accommodating this number elsewhere in the country would certainly also involve costs above those of the notional minimum cost site, but information is not available to judge how other sites might compare either in respect of such costs or the quality of the living conditions produced.

8.6. When the Unit was asked to study Humberside the national population was expected to grow very fast and it seemed possible that an early start in developing several new centres would be needed. At that time Humberside appeared to be on the point of major economic growth which would attract population on a large scale. However, at the national level, plans are now in hand or projected to provide for the population growth of the country during the 1970s, and on Humberside substantial improvements in the infrastructure and increases in employment are first necessary to meet the needs of the growing local population. Moreover major growth on Humberside would require the creation of substantial additional employment opportunities, which could conflict during the next decade with the Government's efforts to stimulate economic growth in the Development Areas. There are therefore good national and local reasons against the early start of a major intake of population into Humberside (paras. 2.13 and 2.15).

8.7. As a major intake of population will not be necessary before 1980, the main urgency to take an early decision on Humberside has disappeared. A firm decision in 1972 would allow time to complete all the necessary planning procedures for building to begin in the late 1970s, with a major inflow of population from 1980 onwards. A decision much later than 1972 on a development of this magnitude would be bound to lead to serious local planning uncertainties.

8.8. By 1972 the effectiveness of the recently intensified distribution of industry policies in different parts of the country and the employment trends within Humberside should be clearer, enabling more precise estimates to be made than those in Chapter 8 of the costs of stimulating employment growth on Humberside. Progress will also have been made towards deciding whether development of a MIDA on the Humberside site would be in the national interest (see para. 4.9) and on the future of steel production at Scunthorpe. Deferring the decision on Humberside until 1972 would also allow a more considered assessment of the precise scale and timing of population growth for which the Area's development should be planned.

8.9. The intervening period will also add to our knowledge of the problems of locating the population in other ways and studies of other areas will have been completed. In particular the difficult issue of the costs and benefits of accommodating large numbers of people in and around the major existing population centres of the country rather than on new sites should become clearer from current work such as the South East Joint Planning Study. Moreover should a substantial overspill scheme emerge as desirable, for example from the South East or the West Midlands, this might well serve as the best possible starting point for major development on Humberside. The success of the Government's efforts to assist the Development Areas will also be much clearer by then so that any adverse effects on these areas of major growth on Humberside in the 1980s could be better assessed. Thus deferring a decision on Humberside until 1972 would enable the decision to be taken on a firmer basis and with a fuller knowledge of its national implications, although there is always the possibility that an unexpected development, such as the arrival of a major labour-intensive industry in the Area, could make an earlier decision in favour of planned growth desirable.

Conclusions

8.10. Our main conclusions are that Humberside has the physical potential for major planned settlement, that it could become a most attractive city region of great value to the nation and that the costs of major development would not be excessive in relation to these benefits. But we cannot yet say whether the costs would be lower, or the benefits greater, than other possible ways of locating a similar population. The most difficult problem would be that of inducing sufficient growth of industrial employment in this Area. and the financial incentives which would. in our view, be needed imply a distribution of industry policy at the relevant time significantly different from present practice. We think that there are valid reasons for recommending that any substantial growth of population and industry should not take place before 1980, which means that a decision need not be taken until 1972, by which time the wider economic implications of growth on Humberside or on alternative sites will be much clearer.

8.11. In the absence of this additional data, the Unit is not making now a recommendation on whether or not there should be major expansion on Humberside in the 1980s. We believe, however, that it is more likely than not that the Area will in the event be needed as an area for major growth. It is valuable to have identified its potentiality well in advance in this way since it gives time for full consideration by all concerned of the implications of, and the detailed forward planning needed for, what would be the largest development project ever attempted in this country. It also enables early action to be taken to safeguard the Area's value to the country as a site for major population location and to prepare it for the possibility of development.

8.12. One way in which the Area needs to be prepared is in the modernisation of its physical infrastructure. The Ministry of Transport's present road proposals, and improvements to the roads from Gilberdyke to Hull and Keadby Bridge to Immingham/Grimsby, will need to be completed before the end of the 1970s (para. 4.94). The programme for the clearance of sub-standard housing should be progressively accelerated on the lines suggested in para. 9.73; this would have the added advantage of increasing the supply of building labour in the 1970s in preparation for major growth later. Work at present in hand to resolve the water supply problems of the Area, both in the short and long term, should be pushed ahead vigorously (paras. 4.47-4.49).

8.13. If there is no immediate decision on Humberside development as a whole, there would be no need to set up now the planning and development agency referred to in para. 7.18, nor to begin preparing a master plan. However it is desirable to avoid action which could impose constraints on the preparation and implementation of such a plan. Any decision by the planning authorities of the Area should from now on, through some form of joint consultative arrangements, take full account of the possibilities and needs of major development. Further research and planning work is also desirable on a number of outstanding issues including those identified in Chapters 7 and 10.

8.14. We have concluded in Chapter 4 that with or without planned expansion a Humber bridge will be needed in the early 1980s and that with planned expansion there would be a strong case for bringing the completion of the bridge forward into the 1970s, preferably 1976. However to ensure that the bridge were open for traffic in 1976, the decision to go ahead would need to be taken in 1969, i.e. well in advance of the last date for the decision on planned expansion itself. As argued in paras. 4.113 and 4.114, the early construction of a bridge could play a significant role in maintaining the economy of the Area during the 1970s. It would also ensure that if there were any unexpected development in the next few years pointing to the immediate start of planned immigration, there would be no delay in taking full advantage of the opportunity offered. Should major planned expansion be further postponed a bridge would still be needed to meet the inherent requirements of the Area in the early 1980s, although advancing completion to 1978 would then have involved the diversion of resources which if used on road construction elsewhere would probably have given a higher first year rate of return (see para. 4.104). An early decision whether or not to go ahead with building a Humber bridge for use by 1978 will therefore call for the very difficult assessment of the likelihood of Humberside being needed for planned expansion in the 1980s, of the balance of benefits and costs involved in bringing construction of the bridge forward in time and of the costs of other measures which might otherwise have to be taken in the 1970s to maintain and stimulate the economy of the Area. We have ourselves concluded on a broad assessment of these factors that a decision should be taken during 1989 to build a Humber bridge with a view to having it open for traffic in 1976.

8.15. The present economy of the Area would not provide a satisfactory base for planned population growth and the prospects of early improvement are uncertain, one factor being the effects of the present measures to stimulate growth in the Development Areas. These prospects would be further weakened if, through any change in distribution of industry policy, the Area were to be placed at a further disadvantage in relation to other parts of the country. If, therefore, recommendations made by the Hunt Committee led to any new status being introduced for areas intermediate between Development Areas and the rest of the country, this status should be conferred on both North and South Humberside. Providing this is done and the improvements to the infrastructure we are recommending are carried out the Area's rate of economic growth should improve substantially during the 1970s and there would be no need to consider further action to stimulate the Area's economy preparatory to major population intake.

Recommendations

8.16. The main recommendations of the Unit are therefore as follows:

i major growth on Humberside should not be planned to take place before 1980;

ii a final decision on growth after 1980 is not needed before 1972, by which time the economic consequences of a decision, both locally and nationally, could be better assessed in the light of new information;

iii the Area should be prepared for the possibility of major development by:

- *a* improvements in roads during the 1970s;
- *b* progressive increase in the rate of replacing sub-standard housing;
- *c* completion of a Humber bridge to be in use by 1976;
- *d* maintenance of its economic growth prospects;

iv there should be joint consultation by the planning authorities to take account of the possibilities of major development;

v the following points should be regarded as essential to the consideration of a decision on major expansion:

- *a* planned growth, to be successful, would have to be on a very large scale, i.e. towards the upper limit of the range of 300,000-750,000 extra people considered in this report (for the reasons given in para. 5.38);
- *b* a planning and development agency to plan and execute the work would be essential (para. 7.18);
- *c* incentives sufficient, in the light of information available at the time, to promote the inflow of industry and to maintain the growth of employment on the necessary scale would be required (paras. 5.36 and 5.37).

Part II Supporting Studies

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9 A PHYSICAL ASSESSMENT OF HUMBERSIDE

9.1. This Chapter analyses the physical background and infrastructure on Humberside and assesses the capacity to deal with the Area's needs without planned population growth, in order to ascertain the base on which planned growth would have to be built.

9.2. The first section deals with those aspects which hinge upon natural resources within, or accessible to, the Area. Some of these will undoubtedly aid expansion: deep water to attract industry and shipping; construction materials; minerals for manufacturing, and water for industrial and domestic use. The natural drainage pattern, and with it the already developed systems for sewerage, sewage disposal and surface-water drainage, will influence the arrangements that can be made for providing drainage for large new areas of development. Natural features—beaches and open country—will affect the leisure opportunities of any new populations. On the other hand large-scale urban growth is bound to eat into agricultural land, one of Humberside's major natural assets.

9.3. The second section deals with the urban and social environment and existing plans for its development: housing conditions and building resources; the city and town centres, roads and other communications; educational facilities and the health services. These are the basic structures upon which major expansion would have to be built; and they would condition the quality of the services which the early immigrants could enjoy.

Natural resources

The Humber estuary

Characteristics

9.4. The Humber estuary stretches some 44 miles from Trent Falls to Spurn Head Light. The width between high tide limits is one to two miles at Hull, two to three miles at Immingham and up to seven miles across from Grimsby to inside Spurn Bight. Deep water extends to just upstream of the mouth of the River Hull on the north bank, a distance of about 24 miles. Map No. 11 shows details of the estuary and of the locations of existing and potential industrial areas along its banks.

9.5. Extensive shoals and flats, which in places dry out for a mile or more offshore, border much of both banks. Sands within Spurn Bight, Sunk Island Sands and Trinity Sands comprise an area of over 10,000 acres which are up to 15 feet above low-water levels. The narrow sand spit at the seaward end of Spurn Bight is about three miles long and is now in the ownership of the Yorkshire Naturalists' Trust. It has shifted considerably in historical times and has been breached on several occasions. It may still be vulnerable to storm damage, but it is uncertain what effect a permanent breach would have on the regime of the estuary.

9.6. Investigations carried out for the British Transport Docks Board suggest that there have been few appreciable changes this century between the shore and the three-fathom line. But flows in the estuary are not at present artificially controlled and there have been some changes in the deep-water areas and in the shoals between the three-fathom limits. Though the tidal range is moderate (20 feet at Immingham at spring tides) the tidal streams can be rapid and irregular.

9.7. The main approach for shipping from the North Sea passes between Spurn Head and Bull Sand. Although there is deep water behind Spurn Head in Hawke Roads and off Hawkin's Point in Sunk Roads, the main navigational channel is across the Grimsby Middle shoal, approaching the Lincolnshire bank between Immingham and North Killingholme. From there it swings across the estuary again to provide a curved and narrow channel along the north bank between Thorngumbald Clough and Hull. Upstream of the Hull Roads the river is shallow with shifting sands, but small seagoing vessels can reach Goole on the Ouse and Keadby Bridge on the Trent.

9.8. A characteristic of the estuary is the siltation, probably due to erosion of the boulder clay cliffs on Holderness, which is carried up and down the estuary by the tides. Large quantities settle inside the docks, which have to be constantly dredged.

Deep water

9.9. The Humber is a major commercial shipping estuary. There are locked dock systems where the deep-water channels come close to the shore at Immingham and Hull. Because of the moderate tidal range, use can also be made of riverside quays and jetties. The main ones are all on the deep-water channel—at North Killingholme Haven, South Killingholme, Salt End and Hull. At present the main limit on a vessel's size is the depth of water that can be guaranteed over the shifting Grimsby Middle shoal. An experimental channel cut in 1994 is now to be regularly dredged and it seems feasible to maintain a passage to Immingham for vessels of at least 96,000 tons and possibly 100,000 tons.

9.10. Towards the sea, safe anchorages with minimum depths of 20-90 feet can be found in Hawke Roads and also, with depths of 19-45 feet, in Sunk Roads. A deep-water oil terminal has been proposed off Tetney Haven, and a scheme for a mono-buoy mooring connected to the shore by pipeline is under consideration. This would accommodate tankers of up to 200,000 deadweight tonnage (dwt).

9.11. Consulting engineers have completed two investigations of the deep-water potential of the estuary for the British Transport Docks Board. The first, dated July 1966, dealt with the possibilities in the Hawke Roads, where the average depth at mean high-water neap tides is at present about 57 feet. The consultants suggested that this depth could be significantly increased by controlling the alignment of channels and providing self-scouring action (by means of half-tide training bunds and spurs), and by dredging. While the need for testing on a tidal model was stressed, the consultants were reasonably confident that tidal berths could ultimately be provided for 200,000 dwt tankers in Hawke Roads. The second report, dated December 1966, dealt with the sea approaches. The investigation showed that on the lowest predicted high tides, vessels with draughts of over 61 ft (above 130,000 dwt) could make the Humber without dredging and that, subject to survey, comparatively little dredging might be needed to provide for 200,000 dwt vessels. While vessels of this size could negotiate the English Channel, navigation might be easier and safer round the north of Scotland, which would give the Humber an advantage over the Thames estuary where deep water is also available. The implications of this for new industrial development on the north bank downriver from Hull are described in paras. 4.9 *et seq.*

Other functions of the estuary

9.12. The Trent and the Yorkshire Ouse river systems which feed into the estuary are the basis for an extensive system of inland waterways. The main interchange points with seagoing vessels are at Goole and Hull.

9.13. The estuary is also important as an outlet for liquid wastes. It receives substantial discharges of untreated sewage, mainly from Hull and Grimsby; and facilities for industrial effluent disposal have been a significant factor in attracting chemical plants to Humberside. A vast volume of water for industrial cooling purposes is also available.

9.14. Because of its commercial use, shifting channels, strong and variable tidal currents, and the muddiness of its waters the estuary has attracted relatively little recreational use.

Agricultural land

9.15. Outside the main urban and industrial areas and the ore workings around Scunthorpe, the Area is fully cultivated with extensive continuous areas of arable farmland. There are also some wooded areas and parklands, for example east of Scunthorpe, around Great Limber, Brocklesby Park, Hotham Hall and Burton Constable. In general the emphasis is on the commercial management of woodlands and relatively little purely 'amenity' woodland is available.

9.16. Map 3 shows the agricultural quality of all land in the Area (other than land in non-agricultural use or land agreed for development by the local planning authorities) according to the national fivefold grading system devised by the Ministry of Agriculture. This system relies on physical characteristics—soil character, relief and climate—which ultimately determine levels and consistency of yields and costs, rather than on existing farm organisation which can alter. The acreages in each of the five categories are given in Table 9a; grades I and II land constitute nearly half of all land surveyed as against only a fifth of all land in agricultural use in England and Wales. It is these lands which are most responsive to improved methods and most easily adaptable to the changing market demands that can be imposed by world conditions.

Grades I and II land

9.17. Grade I land is by definition free of any significant physical limitations on agricultural use. Yields are consistently high and most crops can easily be cultivated, including the most exacting horticultural crops. The predominantly light reclaimed warplands of the lower Ouse and Trent valleys, the alluvial soils of Sunk Island and the particularly deep soils around Burnham in north Lincolnshire are in this category.

9.18. Grade II land is subject to only minor limitations connected with soil texture or depth, drainage, or minor climatic or site restrictions, such as exposure or slope. A wide range of crops can usually be grown with high yields, although the range of horticultural and arable root crops may be restricted. Much of Humberside's grade II land lies in a belt along the Wolds. On the lower slopes the soils are derived from glacial drift, and the boundary with the heavier grade III land towards the east is indeterminate. This extensive tract of category II land contains small patches of thinner, or heavier, soils which have been classified in a lower grade. The southern part of Holderness and a tract of marine alluvium near North Coates are also grade II land; the latter has been excluded from grade I because of exposure risk. A further extensive section of grade II land is located around the lower Ouse and Trent valleys, mainly associated with heavy warplands interspersed with lighter land. Two smaller areas of grade II land are located to the north and south-east of Scunthorpe, both localities having soils derived from oolitic clays and limestones.

Grade III land

9.19. On grade III land only the less demanding of the horticultural crops can be grown, and arable root crops may be limited to forage. Grass and cereals are thus important; land in this grade supports some of the best quality grassland in the area. In the East Riding, the areas on either side of the Wolds are classified as grade III as well as the Hull valley and parts of central and coastal Holderness. In the coastal areas north of Spurn Point exposure also has an effect on arable farming. On the south bank several areas with varying yields are classified as grade III, including parts of the Ancholme valley and the Isle of Axholme.

Grades IV and V land

9.20. Generally grade IV land is only suitable for low-output enterprises, while grade V land is under grass or rough grazing. Most of the grades IV and V land in the Area is in small and scattered areas.

Minerals for manufacturing industry

Ironstone

9.21. Over the past few years the production of Frodingham ironstone has been averaging about 100,000 tons a week—about a third of the total home iron ore production. The ironstones outcrop at Scunthorpe and dip immediately east of it at an average inclination of about 100 feet per mile. They have been proved to within a few miles of the coast. Ore content averages only 21 per cent, but the seam is over 30 feet thick in

TABLE 9a

Agricultural land

Classification	Area surveyed		North Bank		South Bank	
	acres '000	%	acres '000	%	acres '000	%
Grade I	43·4	5·4	30·7	5·8	12·7	4·6
Grade II	337·9	41·9	219·9	41·5	117·9	42·6
Grade III	400·7	49·6	270·4	51·0	130·3	46·9
Grade IV	13·3	1·6	6·2	1·2	7·1	2·6
Grade V	11·9	1·5	2·4	0·5	9·5	3·4
Total	807·1	100·0	529·5	100·0	277·6	100·0

Source: Based on material supplied by the Ministry of Agriculture, Fisheries and Food.

parts and is remarkably free from faulting. The phosphoric ore is consistent in quality. The outcrop is being worked opencast over a distance of about eight miles south from Coleby, and up to 150 feet of overburden is being removed; but as the depth of the seam increases to the east an increasing proportion of the output is coming from mines at Santon and Dragonby. The surface workings cause considerable disturbance; restoration and reclamation are being carried out, but progress has been limited by the nature and scale of the worked-out areas. The methods of underground working minimise surface effect and no appreciable subsidence has occurred.

9.22. As well as wide areas covered by planning permission for ore extraction there is a much larger area to the east where the local planning authority has agreed to consult the former steel companies upon planning applications, to avoid development which might prejudice long-term exploitation of the orefield. When the British Steel Corporation has finished preparing its long-term plans for the British steel industry, probably in 1969, it will be easier to assess the likely future of this ore body. Costs of extraction by opencast methods will rise steadily as the workings move eastwards, and the sinking of new underground mines would be even more expensive. There must therefore be a limit beyond which extraction is unlikely ever to be worthwhile. Discussions should be held with the British Steel Corporation, once their long-term plans are complete, on the fixing of those limits so that planning of urban development beyond them will not be inhibited.

Silica sand

9.23. South of Scunthorpe blown sands of recent origin are a valuable source of silica sand. This is produced from workings mainly in the Messingham area, for glass making and foundry purposes largely in the West Riding and the Midlands. Proposals in the Scunthorpe Town Map for a limited southern expansion of the town stop well short of these mineral reserves. Small quantities of moulding sand are also produced near North Cave.

Anhydrite

9.24. Recent borings have revealed two anhydrite horizons within the Permian evaporites south of Thorne. The upper one is at a depth of 900 feet and dips eastwards at a slope of 1 in 10. Their full extent is not known, but they are unlikely to extend eastwards where the evaporite deposits are represented by salt horizons lying at considerable depth. It is conceivable that working of these deposits (on the pattern of Imperial Chemical Industries' anhydrite mine at Billingham) may become economically desirable to help meet the country's rising demand for sulphuric acid, with cement as a by-product.

Minerals for the construction industries

Chalk, limestone and clay

9.25. Humberside is an important regional production centre for cement, supplying markets locally and in industrial Yorkshire and Lancashire. Geologically, potential reserves of raw material appear to be extensive and well able to sustain the major growth of local demand that would accompany planned expansion. The need, if really large-scale production is to be maintained over the long term, is for the industry to obtain adequate reserve areas for quarrying.

9.26. Production is over 950,000 tons of cement per year, about 5 per cent of United Kingdom output. The two largest works are at Melton and South Ferriby, where the scarp slopes of the chalk Wolds adjoin deposits of alluvial clay. At Melton these clays are nearly exhausted and the thicker deposits of Jurassic Ampthill and Oxford clays which underlie the chalk are being worked. New capacity capable of bringing the output at South Ferriby to 350,000 tons a year has recently been installed. A proposal to increase the capacity at Melton by 300,000 tons was affected by chimney height restrictions aimed at safeguarding Brough airport—restrictions which have recently been waived for chimneys at the neighbouring foundry.

9.27. There is also a cement works at Wilmington on the River Hull to which chalk is sent by rail from a quarry at Hessle; clay is barged from across the Humber. The cement works at Kirton Lindsey uses the Jurassic limestones and clays of the Lincolnshire Cliff.

9.29. Chalk is also produced for whiting and agricultural lime from mainly small quarries scattered throughout the Wolds in both North and South Humberside, and some is used for flux in the Scunthorpe steel works.

9.29. Post-glacial alluvial clays are also used for small-scale brick and clay tile production. Any major increase in the supply of bricks for planned expansion would, however, have to come from outside sources: these are not far away; for example, the National Coal Board's brickworks in the adjoining mining areas, and Peterborough.

Sand and gravel

9.30. Local production amounting to about 500,000 cubic yards a year, mainly from North Humberside, satisfies only half the demand for these important construction materials. There are no workable river gravels in the Area and local production is from glacial deposits. On North Humberside these are worked around Keyingham, Burstwick and extensively at Brandesburton, and on South Humberside at Aylesby; small pits are also worked occasionally to meet local demands. At present the main source of external supplies is the Trent valley—over 400,000 cubic yards a year are barged to Hull. Supplies also come from the Doncaster, Lincoln and Goole-Selby areas.

9.31. However Humberside is very well placed to take advantage of potentially very large resources of marine sand and gravel. At present about 150,000 cubic yards a year are landed at Hull and Immingham, but licences have been, or are being, granted covering the dredging of 2·3 million cubic yards a year off the Humberside coast. Firms dredging in this area have already contracted to supply seven million cubic yards to Europoort in Holland.

Other construction materials

9.32. One of the by-products of the Scunthorpe steel industry is slag which is extensively used in road construction especially for surfacing. With coal-fired power stations nearby, the Area is well placed to secure supplies of pulverised fuel ash, which is excellent material for embankment construction and for filling over poor ground.

Energy supplies (See Map 12)

Coal

9.33. Humberside is on the fringe of the Yorkshire, Nottinghamshire and Derbyshire coalfields and thus within easy haul of some of the country's most efficient, long-life pits. The Humber is an established coal export outlet with new facilities being developed at Immingham.

9.34. Proven coal reserves amounting to some 300-400 million tons exist in the Selby area, and further reserves probably underlie the rest of the western part of the Area. The coal measures dip eastwards at slopes between 1 in 20 and 1 in 40; at Haxey, 10 miles south-west of Scunthorpe, workable coal seams have been proved in borings at depths between 2,500 and 3,300 feet. The nearest active colliery is at Hatfield Main, 15 miles west of Scunthorpe. If it ever becomes economic to extend coalmining in this area, workings are most unlikely to affect major population development, which will probably be well to the east.

Natural gas

9.35. The first commercial strike of natural gas in the British sector of the North Sea was the discovery by British Petroleum in 1965 of the West Sole field. A 16-inch submarine pipeline with a capacity of over 200 million cubic feet a day was laid to the terminal at Easington, North Humberside, in 1966. First regular supplies of gas were received by the Gas Council in July 1967 and gas is now being delivered at rates of up to 150 million cubic feet per day. Up to the present the only other North Sea terminal is under construction at Bacton in Norfolk.

9.36. From Easington the natural gas is taken by a 24-inch, 1,000 pounds per square inch (psi) pipeline crossing the estuary at Paull Roads and running westwards to the national methane grid system near Sheffield. There is also a connection by a 12-inch link from East Halton to the East Midlands Gas

Board plant at North Killingholme. This plant also takes liquid petroleum distillate from the Continental Oil terminal at Immingham by an 18-inch pipeline and could, by the same means, take supplies from the refineries now under construction. It can now produce 225 million cubic feet a day of town gas which is fed into the regional gas grid via a 30-inch, 1,000 psi pipeline to Scawby (near Scunthorpe) and thence to Doncaster, Northampton, and the West Midlands.

Electricity

9.37. With ample supplies of some of the cheapest coal in the country from the East Midlands coalfield and cooling water from the Ouse/Trent systems several large electricity power stations are being set up close to the western boundary of the Area. Ferrybridge 'C' and Eggborough to the west of Selby will be of 2,000 MW capacity, and Drax east of Selby will be at least 1,980 MW and possibly up to 4,000 MW. There are other large stations at Thorpe Marsh, West Burton and Cottam to the south-west. The Area should therefore have no difficulty in drawing on any needed supplies of electricity. The Central Electricity Generating Board also owns a large site for a power station at Killingholme on the Humber estuary. The site has good foundations, ample supplies of cooling water and is well placed for supplies of natural gas, oil and coal if these should be needed instead of nuclear power. Any major increase in demand for electricity in the Area, such as might arise from major electricity consuming industries, could be readily met.

Water supplies

9.38. The Area embraces all or parts of the supply areas of six water undertakings (see Map 13). Most of the water is derived from the three aquifers which occur in the Area: the Bunter Sandstone, the Jurassic Oolitic limestone series, and the chalk. The East Yorkshire (Wolds area) Water Board relies on boreholes and springs in the chalk. Hull Corporation abstracts water from the River Hull and also has boreholes in the chalk. The North Lindsey Water Board and the North East Lincolnshire Water Board have chalk sources supplemented by sources in the limestone. The Bunter Sandstone is exploited by the Pontefract, Goole and Selby, and the Doncaster and District Water Boards. This source is of little significance for major new development in the Area; new boreholes are unlikely to have a sufficiently large yield to justify the expense of piping, and the water is excessively hard. Apart from Hull's abstraction from the River Hull, river sources are used for industrial purposes and for agricultural irrigation.

9.39. For this Study, attention was concentrated on the three major undertakings on Humberside: Hull Corporation, and the North Lindsey, and North East Lincolnshire, Water Boards.

The existing position

9.40. Table 9b summarises the present supply and consumption situation of the three undertakings studied. Details of sources of water in 1969 are set out in Table 9B.1, columns 1-5.

9.41. By 1966 demand on the south bank was already within 1·1 million gallons per day (mgd) of the permanently licensed yield of existing sources. This situation has been brought about by the general increase in demand and particularly by the establishment since 1949 of several large water-using industrial plants on the Humber bank. These industries moved to Humberside at a time when water was freely and cheaply available from underground sources. Until new sources can be developed the Water Board has been temporarily authorised to pump an extra 7·0 mgd, hence the total current margin of 8·1 mgd shown in Table 9b, Cols. 4 and 5.

Growth in domestic demand for water

9.42. In Table 9c the projected population increases (see Chapter 2) have been applied to the 1966 populations of the three main water undertakings to indicate how domestic demands might rise on the basis that consumption per head over the period would rise steadily to an average of 45 gallons per day in 1991. On these assumptions total domestic demand in the Area would increase from 23 mgd in 1966 to 27 mgd in 1971, and to 36 mgd in 1981.

TABLE 9b

Water consumption and supply 1966

million gallons per day

Item	Total, three supply areas	Kingston upon Hull C8C	N. Lindsey W8	N.E. Lincs W8
(1)	(2)	(3)	(4)	(5)
Consumption				
Unmetered	22·9	12·5	3·6	6·8
Metered and bulk industrial	28·5	9·9	2·1	16·5
**Reliable yield*	63·8	26·7	8·6	28·5
†Current margin	12·4	4·3	2·9	5·2

* Reliable yield is the average daily quantity available for supply in the most adverse circumstances.

† Current margin is the amount by which reliable yield exceeds consumption.

TABLE 9c

Domestic demands for water 1966, 1971, 1976, 1981

Item	Kingston upon Hull Corporation				N. Lindsey and N.E. Lincs. Water Boards			
	Actual 1966	1971	*Projected* 1976	1981	*Actual* 1968	1971	*Projected* 1978	1981
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Population assumptions '000	419	436	453	471	291	301	312	324
Domestic consumption gallons per head per day (gphd)	30	35	40	45	36	39	42	45
Domestic demand million gallons per day (mgd)	12	15	16	21	11	12	13	15

Industrial demand

9.43. In 1996, 59 per cent of the water supplied by the three undertakings went to industrial and commercial users. On the south bank the proportion was 95 per cent; in addition, industry drew almost as much from private boreholes as it took from the public supply. Information supplied to the water undertakings by existing major industrial concerns suggests that industrial demands in the Area may rise from 29 mgd in 1966 to 46 mgd in 1971. A summary of these forecasts is given in Table 9B.2. Forecasts beyond 1971 have been obtained from some firms but are necessarily tentative.

The short-term prospect

9.44. In response to the very large increase in demand for industrial purposes on the south bank by 1971 several water schemes are already well advanced. The most important is the Great Eau scheme of the North East Lincolnshire Water Board which was developed to produce 6 mgd in 1969 and will produce 14 mgd by 1971. The North Lindsey Board should obtain a further 1·0 mgd from its Barrow vale source if it obtains control of the Barrow cress beds and 0·5 mgd from a possible new borehole in the limestone at Hibaldstow Bridge. Also, in 1971, the North Lindsey Board will have temporary powers to abstract a further 5·2 mgd both from new and existing sources, some of which may prove suitable as permanent sources of supply.

9.45. Altogether these additional sources (see Table 9B.1, cols. 6 and 7) will increase the reliable yield on the south bank to 50·3 mgd, well above the total demand estimate for 1971 of 43 mgd. The margin of about 7 mgd could, however, be quickly wiped out if many of the temporarily licensed sources had to be given up or if industrial demands after 1971 continued to rise at the rate forecast for the preceding period.

9.49. On the north bank the total estimated 1971 demand of 30 mgd exceeds the present reliable yield of 27 mgd. It is possible, however, that the deficit could be temporarily covered by some increases in abstraction from the River Hull, though there have been no formal moves to arrange this.

The 1970s

9.47. Two important schemes are being investigated to deal with the potential shortages which could arise on both banks in the 1970s. In Lincolnshire the North Lindsey Board's consulting engineers reported on the development of the Ancholme valley in March 1967. They favoured a scheme in which existing chalk sources could, if necessary, be over-pumped at times when no river water could be taken. This would provide an overall increase of 5 mgd by 1971, but would exhaust the local possibilities on the south bank. For additional sources the consulting engineers recommended that, from 1971 onwards, Ancholme water should be supplemented by water from the River Witham augmented, as necessary, by water from the River Trent. The result would be to increase available supplies by a further 10-15 mgd, assuming it will prove possible to accept the polluted Trent water. After increases in domestic demand of, say, 3 mgd have been met, the margin for industrial demands would then be between 13 mgd and 23 mgd (over and above the 1971 forecast industrial demand of 31 mgd). Thus provided an early start is made on the Ancholme scheme a water shortage crisis on South Humberside in the 1970s is unlikely, although the area is not yet in a position where new major water-using industries could be readily accepted.

9.49. On the north bank the Water Resources Board's interim report on water resources in the north of England* has recommended an immediate start on the Farndale-Derwent scheme. The Elvington intake on the River Derwent, which at present produces 15 mgd for Sheffield, Leeds, Rotherham and Barnsley, will shortly produce 25 mgd by completion of works now under construction. There is a current proposal for a regulating reservoir which would provide an estimated additional 25 mgd, making a total of 50 mgd from the intake. Additionally the regulating reservoir would also enable a further 25-40 mgd to be abstracted above a weir at the tidal limit of the river. Such schemes, with Hull's participation, would require new powers and action by the water undertakings and the River Authority. Negotiations have begun and there is little doubt that these arrangements could secure North Humberside's position in the 1970s.

Conclusion

9.49. Provided work is started in time there should be no water shortage on either bank of the Humber during the 1970s, but there is not a sufficient surplus in sight to make it safe to add more major water-using industries to the south bank. North Humberside has some spare capacity in sight with the Farndale-Derwent scheme, but it is clear that a major development on Humberside would need substantial new sources of water.

Sewerage and sewage disposal
(See Map 14)

Existing sewerage systems

9.50. The western part of Hull together with Haltemprice is drained by sewers in which foul sewage and surface water gravitate to the Humberside pumping station at West Dock Avenue, which discharges the untreated sewage into the Humber. The station has a large pumping capacity, but the trunk sewers are only large enough to serve the limited areas so far agreed for building. Provision of new trunk sewers to the pumping station from any large new development areas west and north of Hull could involve expensive tunnelling in difficult ground under the existing built-up area. The eastern area of Hull drains to the Hedon Road pumping station near King George Dock. There too the capacities of the deep trunk sewers are limited and there is little scope for extending the existing system.

9.51. The Wawne Estate to the north-east of Hull will be drained by a completely new sewerage system now being built; this will fall to a new treatment plant which will discharge its effluent into the River Hull. This system could be extended and modified to deal with the possible extension of the Wawne Estate into the area north of the Wawne Drain.

9.52. On South Humberside the position at Grimsby-Cleethorpes is broadly similar to that at Hull. The untreated sewage is pumped into the Humber, north and east of the town; in the case of the outfall at Cleethorpes the sewage is stored for discharge on ebb tides via a ¾-mile long pipe into the sea. Both systems take in villages in the neighbouring areas and are capable of dealing with all the areas allocated for development in the Town Maps and possibly a little more. At Scunthorpe temporary works have been carried out to improve the effluent at the overloaded works at Ashby, which are near housing areas. It is however planned to transfer the load to an extended works at Yaddlethorpe, which could be designed to cater for a southward growth at Scunthorpe beyond the limits identified in the current Town Map.

9.53. There are thus no special difficulties over the sewerage of areas already agreed for development in the three main urban areas of Humberside. Apart from Scunthorpe, however, the existing systems do not have sufficient spare capacity to serve any new large areas of development.

River pollution

9.54. Humberside lies within parts of the areas of three river authorities. North Humberside is entirely within the area of the Yorkshire Ouse and Hull River Authority, while South Humberside, divided by the watershed formed by the Lincoln Edge, is to the west within the area of the Trent River Authority and to the east within that of the Lincolnshire River Authority.

9.55. The Trent is tidal throughout its Humberside stretches and heavily polluted over much of its course. A contributory source of pollution within the Study Area is the discharge of about 1 mgd of wastes from the Scunthorpe steel works. These are difficult to treat and there is a proposal to pipe them, together with some chemical effluents from Scunthorpe and Flixborough, to deep water off the south Humber bank.

9.56. The quality of the water in the Humber itself is affected not only by the quality of the discharge from the Trent but also by the polluted waters of the Ouse and by the discharge of between 20 and 30 mgd of untreated, mixed domestic and industrial wastes from Hull. The tidal effects produce an intermittent movement upstream of the sewage from Hull. The condition of the Humber has been found to be at its worst, chemically, near the point where it is joined by the Trent. There the dissolved oxygen content of the water has been generally only just over 10 per cent of saturation, and occasionally zero.

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* *Interim Report on Water Resources in the North.* HMSO, 1987.

9.57. Downstream from Trent Falls the dissolved oxygen content of the river steadily improves, apart from a marked reduction over a five-mile stretch off Hull, and reaches a level of 80 per cent of saturation at the seaward end of the estuary. The discharge of over 16 mgd of industrial wastes from the Immingham-Grimsby area does not seem to have much effect upon the dissolved oxygen content in the estuary, owing to the great volume of water in the deep tidal channel at this point. Nevertheless there have been suggestions that industrial effluents should be taken further south to be discharged out to sea.

Amenity and recreation

The countryside

9.58. The greater part of Humberside comprises attractive English lowland countryside, with scenery reflecting the Area's physical structure. The main landscape types are:

a chalk Wolds with their characteristic smooth topography and with the scarp slopes affording the main viewpoints,
b lower Jurassic uplands;
c flat plains of the Trent, Ouse, Hull and Ancholme valleys;
d 'hummocky' boulder clay plain of Holderness;
e estuarine marshes.

The essential characteristic is spaciousness with sky and, near the estuary and coast, water, forming an important element.

9.59. No part of the Area has been designated under the 1949 National Parks and Access to the Countryside Act as an 'area of outstanding natural beauty'. In the East Riding Development Plan* several vales which dissect the scarp slope of the Wolds, together with parklands such as Hotham, Houghton, South Dalton and Burton Constable, have been identified as areas of great landscape value. The Lindsey Plan† puts in the same category the scarp slopes at Alkborough and South Ferriby, the heaths and woodlands east of Scunthorpe, Brocklesby Park and the Wolds in the south of the Area. These gradings are incorporated in Map 6, which represents an attempt to provide a descriptive classification (mainly subjective) of landscape qualities. The most important and scientifically interesting sites in or near the Area are Spurn Head, the Humber Wildfowl Refuge, Hornsea Mere, Saltfleetby Theddlethorpe Nature Reserve, the chalk grassland sites in the north of the Area and the lowland heathland at Skipwith Common, Scotton Common and Linwood Warren.

9.60. The whole Area is intensively farmed in predominantly arable holdings. As such it has no spectacular tourist appeal, and access to open land is very limited. Enjoyment of the countryside is mainly confined to picnics on roadside verges, motoring, cycling and walking. There is, however, the impressive scenery of the north Yorkshire Moors, the Yorkshire dales and the Peak District within a 50-60-mile radius of Humberside.

The estuary

9.61. The estuary affords a splendid centrepiece for views from the Wolds. Downstream there is all the interest of a busy commercial waterway. But the Humber, unless a barrage is built, is physically unsuitable for most popular forms of recreation. The Humber Yawl Club is located at Brough Haven and there are sheltered moorings at Ferriby Sluice, but conditions are suitable only for experienced people with well-found craft. The estuary is interesting to the naturalist and to the wildfowler. The wildfowl refuge is one of the principal goose roosts in eastern England. Geese have numbered up to 20,000 and duck some 30,000.

9.62. The clay pits on both banks are used for dinghy sailing and fishing. The Barton pits are relatively small though it might be possible, at the cost of spoiling the fishing, to obtain a one and a half mile-long stretch of water for rowing or sailing if the banks between them were removed.

The coast

9.63. On the East Riding coast of the Area there are somewhat narrow but sandy beaches generally backed by low, crumbling boulder clay cliffs. Hornsea and Withernsea are small popular seaside towns; there is some sailing on Hornsea Mere and a few caravan sites along the coast. Both the railway lines from Hull are closed and the approach roads are poor. On the south bank Cleethorpes is a popular venue for day visitors, with large caravan and chalet sites at Humberston.

9.64. The main seaside holiday areas are immediately beyond the Area: Bridlington and Scarborough to the north, and Mablethorpe and Skegness to the south.

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* *Development Plan, 1960.* East Riding of Yorkshire County Council.

† *Development Plan, 1955.* Lincolnshire (Parts of Lindsey) County Council.

The urban infrastructure

Development plans

9.65. Approved statutory Town Maps, some of which are overdue for review, cover the main built-up areas of Humberside. The position is as follows:

	Approved
Kingston upon Hull	July 1954
Haltemprice and areas adjacent to Hull	January 1960
Grimsby	July 1954, review approved May 1965
Cleethorpes, Humberston and Waltham	March 1965
Scunthorpe	May 1955, review approved August 1966
Brigg	May 1955

These statutory plans are supported by 'Local Development Maps' adopted by the East Riding County Council for Beverley, Hornsea, Withernsea and the southern part of Beverley Rural District. Lindsey County Council's North Lindsey Report, *Survey 1965*, contains an outline of proposals supplementing material in the statutorily approved plans; the County Council has also published an advisory plan for Immingham, and in 1965 carried out a non-statutory review of the plan for Brigg. In addition to the areas allocated for housing in these documents there are planning permissions and commitments covering other proposed residential areas; of these the most important are those included within the recent boundary extensions of Kingston upon Hull County Borough in the Wawne, Bilton and Greatfield areas. These allocations, permissions and commitments taken together provide a broad estimate of the amount of agreed building land currently in the pipeline, against which have to be set the probable housing and other needs of the Area's growing population.

Housing needs

Demand for replacements

9.66. Humberside has large numbers of sub-standard dwellings. There is no single source of information from which reliable estimates of the number and distribution of unfit houses can be made. The 1966 census, based on a 10 per cent sample, recorded households lacking certain amenities, such as a hot water tap or a fixed bath; it was estimated, for example, that just over 50,000 households on Humberside were without an indoor water closet. But there is no information about the size or structural condition of these properties. The only available data which take into account a range of circumstances is the Inland Revenue's assessment of rateable value. This reflects size, condition, equipment and environment and, except in areas where prices for accommodation are abnormal, is probably the best single indicator. Thus in many areas a dwelling with a rateable value of less than £30 per annum can be regarded as a likely candidate for relatively early clearance. In round numbers there were 60,000 separately assessed dwellings in this category in the Area in 1966 out of a total housing stock of 190,000 privately-owned and 60,000 local authority houses. About 21,000 had been declared statutorily unfit.

9.67. Table 9d provides some comparisons. In North Humberside the position is similar to that in the Yorkshire and Humberside Region as a whole, with the proportion of likely sub-standard dwellings twice as high as in England and Wales generally and, also, higher than in the other two northern Regions. On South Humberside the position is broadly similar to the national average, with the high standards in Scunthorpe offsetting some deficiencies elsewhere.

TABLE 9d

Sub-standard dwellings as proportion of total housing stock 1966

%

Area	Statutorily unfit dwellings	Dwellings with rateable value less than £30
North Humberside	12	34
South Humberside	3	14
Yorks. and Humberside Region	9	34
England and Wales	5	17

9.68. The statutorily unfit dwellings are an immediate problem, while the low rateable value dwellings could represent a clearance problem in the medium term. But obsolesence is a continuing problem. For example, by the end of the century houses built in 1921 could be at the end of their useful life.

9.69. Past building rates are the main factor determining the scale on which residential areas will become obsolescent, and census records of housing stock from 1861 onwards have been examined for this information. These are a good guide to past rates of net physical growth, but the extent to which they indicate the age of the existing stock depends upon past rates of redevelopment. Information on this is uneven, but adjustments based on the available evidence suggests that in the two largest built-up areas—Hull and Grimsby—the age distribution of existing dwellings might be approximately on the lines indicated in Table 9e. In Scunthorpe there are probably less than 2,000 dwellings that were built before 1901 and about another 2,900 built between 1901 and 1921.

TABLE 9e

Estimated age of dwellings 1966

'000

Area	Pre-1861	1861-1901	1901-21	Post-1921	Total
Hull area	26	17	10	62	115
Grimsby area	7	8	8	28	51

9.70. Using these estimates it is possible to arrive at a broad assessment of the scale of the long-term clearance problem. The calculations summarised in Table 9f assume that:

- *a* by the end of the century 80 years will be accepted as the average life of most dwellings;
- *b* all the existing unfit and low rateable value dwellings were built before 1921;
- *c* in rural areas, where very little building took place in the late 19th and early 20th centuries, the problem is limited to the existing unfit and low rateable value dwellings.

TABLE 9f

Assessment of housing clearance needs 1966–2001

'000

Item		Humberside	North bank	South bank
Immediate: unfit houses		20·9	19·2	2·6
Medium term:	balance of low rateable value dwellings	40·0	30·4	9·6
Long term:	balance of pre-1921 dwellings			
	Hull area	15·4	15·4	—
	Grimsby area	17·3	—	17·3
	Scunthorpe	4·6	—	4·6
	Total	37·3	15·4	21·8
Total: 1966-2001		98·2	64·0	34·1

This assessment suggests there may be about 100,000 dwellings to be cleared by the end of the century, of which about two-thirds are on North Humberside.

Demands for additional dwellings

9.71. However although parts of Humberside have unusually large numbers of old properties the Area has not the serious problems of accommodation shortages and overcrowding which affect many of the country's urban areas. The evidence of the 1966 census suggests that there is both some shortage of dwellings and some overcrowding in Hull and Grimsby; there is also some overcrowding in the rural areas though no basic shortage of dwellings. It is not possible to give precise figures, but it would appear that an addition to housing stock of some 10,000 dwellings would meet current outstanding deficiencies and leave a comfortable margin of vacant dwellings within which rearrangements and movements of households could take place with reasonable freedom.

9.72. The main changes in the numbers of households from marriages, deaths, etc., could be modified by inward and outward migration. Without any such movements it could be expected that the number of households would increase between 1966 and 1991 by about 15,000 on North Humberside and 10,000 on South Humberside.

House building programmes

9.73. In *A Review of Yorkshire and Humberside** the Economic Planning Council for that area suggested that building rates in the Region should be high enough to replace all sub-standard dwellings (defined as those below £30 per annum rateable value) by 1981, to relieve overcrowding and to accommodate population increase. In their comment on the *Review* the Government accepted that this provided a reasonable basis for planning. Tables 9g and 9h illustrate the general levels of building and rebuilding that would be needed. Table 9g shows how such a hypothetical clearance programme would relate to past performance and to the long-term problem. Table 9h provides a general indication of how building rates might have to increase over the period to 1991, assuming population increase post-1966 was confined to natural changes. The requirements in Table 9h do not provide for personal desires by the local population for better or different accommodation. These could impose a further load on the construction industry, mainly in the private sector.

8.74. On the south bank the position in the 1970s will be relatively easy. On North Humberside, however, there would be a major burden on the public sector in meeting the

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* HMSO, 1966.

TABLE 9g

A hypothetical housing replacement programme 1966–2001

'000

Area	Dwellings with rateable value less than £30 1966	Closures 1966	Dwellings to be replaced per annum				No. 1961-2001
			1966-71	1671-76	1978-81	1981-2001	
Hull area	38·0	1·3	1·5	2·2	3·6	0·7	14
Rest	10·7	0·2	0·3	0·6	1·1	—	1
North bank	48·6	1·5	1·8	2·6	5·0	0·7	15
Grimsby area	5·2	0·3	0·3	0·4	0·3	0·9	17
Scunthorpe	0·5	—	—	—	—	0·2	4
Rest	6·5	0·2	0·2	0·5	0·7	—	1
South bank	12·2	0·5	0·5	0·9	1·0	1·1	22
Humberside—total	80·8	2·0	2·3	3·7	8·0	1·8	37

TABLE 9h

Hypothetical building programme 1966–81 (assuming nil migration)

'000

Demand	Average number of new dwellings per annum			
	1951-66	1966-71	1671-76	1976-81
Closures	1·1	1·8	2·8	5·0
Shortages and overcrowding	1·6	1·0	0·4	—
Household formation		1·0	1·0	1·0
North bank	3·0	3·6	4·2	5·0
Closures	0·4	0·5	0·6	1·0
Shortages and overcrowding	1·7	0·6	—	—
Household formation		0·6	0·7	0·7
South bank	2·1	1·7	1·5	1·7
Humberside	5·1	5·5	5·6	7·7

needs arising from a much accelerated rate of clearance. Except for Scunthorpe, a high proportion of the local authority building effort on Humberside is already being absorbed in offsetting closures (see Table 9f); the replacement rates postulated would by themselves call eventually for more than doubling the current local authority building rate on the north bank. Looking at the problem as a load on the construction industry as a whole the task becomes that of raising the total building rate on the north bank from its present level of about 3.600 dwellings a year to around 6,000 a year by the late 1970s. This would involve a substantial, but not impossible, increase in the building labour force but, on the assumptions made, it could impose a strain on the Hull County Borough Council's resources. Hull is however an active housing authority and is already making considerable use of industrialised building.

9.75. If this rebuilding programme were not completed on North Humberside in the 1680s and 1990s planned expansion would not be precluded. It would merely mean that some of the replacement backlog would persist into the 1960s and would remain something of a charge upon local building resources over part of the period of planned expansion.

Supply of housing land

9.76. On the north bank Hull Corporation plans to demolish 9,750 dwellings between 1666 and 1671 and a further 11.650 over the following ten years—a total of over 21,000 dwellings to 1981. It might be possible to rebuild 10,000 dwellings in the cleared areas. To meet the deficiency and other needs there are agreed sites for about 5,000 dwellings within the present city boundary and it might be possible to find other sites which would push this estimate nearer to 6,000. In the proposed extension to the city area there is an agreed area south of the Wawne Drain where about 9,000 dwellings will be built. To the north of the Wawne Drain there is a further area for which there is yet no planning permission but which could take perhaps another 6,000 dwellings.

6.77. The position in 1666-81 might therefore be summarised as follows as far as the extended city area is concerned:

Sites for new dwellings, 1866-81:	*No.*
within existing city boundary	6,000
south of Wawne Drain	9.000
north of Wawne Drain	6,000
redevelopment areas	10.000
Total	31.000
Losses on redevelopment	21,000
Net gain	10,000

In the contiguous urban area of Haltemprice UD there are agreed sites for a further 3.000 new dwellings, so that for the continuous urban area of Hull and Haltemprice agreed building areas could provide a net addition to housing stock of about 13,000 dwellings.

9.78. In the rest of North Humberside there are agreed sites for at least another 11,000 dwellings. About 5,000 of these are in Beverley Borough and in Beverley RD, North Ferriby, Elloughton and South Cave, and another 3,000 are covered by recent planning proposals for Hedon. The remainder are at Hornsea, Withernsea and villages in Holderness and Howden RDs.

TABLE 9i

Dwellings built on Humberside and closures (including demolition) 1961–68

Mid-year to mid-year	Total			Public sector				Private sector	
	North bank	South bank	Humber-side	North bank		South bank		North bank	South bank
	dwellings	dwellings	dwellings	dwellings	of which offsetting closures	dwellings	of which offsetting closures	dwellings	dwellings
1961-82	2,337	1,834	4,171	1,010	830	485	356	1,327	1,349
1962-63	2,127	1,835	4,062	1,052	878	657	344	1,075	1,278
1963-64	2,857	1,832	4,789	1,531	1,056	530	322	1,326	1,302
1964-65	3,730	2,109	5,839	2,113	1,083	788	249	1,617	1,323
1855-66	3,517	2,762	6,379	2,090	1,518	1,331	473	1,527	1,431
1986-67	3,286	2,832	6,118	1,831	1,605	1,420	385	1,355	1,412
1967-68	3,598	2,464	8,052	1,793	1,068	832	311	1,805	1,532

8.79. The total number of sites for new dwellings on the north bank is thus estimated to amount to about 45,000 (or a net increase of 24,000 allowing for a clearance of 21,000 sites in Hull). Numerically, this would meet needs on the basis of recent average building rates until the late 1970s. But before then new sites would have to be found to secure a continuity of supply for the builders, even assuming that all the present sites are properly located in relation to demands and are available to developers. Also, the later stages of Hull's present programme will be relying heavily on the availability of cleared sites, which could create difficulties. To fulfil the accelerated building and rebuilding programme set out in Table 9h would require in the 1870s new sites outside redeveloped areas for over 10,000 further dwellings (on the basis that on average only one new dwelling could be built on the site of two cleared).

9.80. On South Humberside there are agreed sites for 27,000 dwellings. Roughly 12,000 of these sites are in Grimsby-Cleethorpes, in Immingham and other parts of Grimsby RD and in parts of Glanford Brigg RD which are reasonably adjacent to the Humber bank. It is estimated that there could be sites for about 5,000 dwellings in Barton and Brigg and in villages throughout the Area. A number of these would be likely to prove attractive to workers in the south bank industrial areas; the remainder of the agreed sites—about 10,000—are located in the area of Scunthorpe Town Map. These sites could numerically sustain recent average building rates until the late 1970s. They would also cover the programme set out in Table 9i.

Supply of industrial land

8.81. In 1966 over 4,500 acres of land within the Area were used by manufacturing industries, together with associated commercial users and oil storage installations. In addition 750 acres were being developed. The general distribution of these areas in 1966 is set out in Table 9j.

8.82. The largest concentrations were in the Hull Docks estate and in the adjoining industrial and commercial areas spreading up the Hull valley; along the Humber bank stretching north from the Grimsby Docks estate; and inland around the Scunthorpe steel works. Altogether the Docks Board's estates at Hull, Immingham, Grimsby and Goole cover over 3,600 acres, of which just over 1,500 acres are taken up by actual port facilities and over 500 acres are in industrial use (included in Table 9k).

9.83. Despite their concentration near deep water, Humberside industries show little or no dependence on direct access to deep-water loading and unloading facilities. Fisons have facilities within Immingham Dock and all the other south bank waterside industries are supplied through the docks or the Docks Board's jetties. On the north bank, BP Chemicals (UK) Ltd. (formerly Distillers) are supplied through the Salt End jetties; the rest of the developed deep-water frontage is used for dry cargoes.

TABLE 9j

Land in industrial use and being developed 1966

acres

Area	In industrial use	Being developed
Hull, Ferriby and Brough	1,500	30
Goole	70	—
Beverley	100	—
North bank	1,570	30
Grimsby-Cleethorpes	400	20
Immingham-Humber bank	590	650
Goxhill-South Ferriby	70	10
Scunthorpe, Brigg and Trentside	1,850	30
South bank	2,910	720
Humberside—total	4,580	750

9.84. Employment density varies considerably from plant to plant. Some premises are old or on cramped or awkwardly shaped sites, and give little guide to the kind of densities that may be expected in new development. It is, however, possible to detect a pattern of employment densities among the newer industries where there are no obvious site constraints on works layout. Broadly there seem to be four groups, as follows.

Group	*Workers per acre*
Oil, gas, etc., installations	1 - 3
Chemicals, steel, etc., plant	10 - 20
General manufacturing	40 - 100
Clothing, food, light assembly industries	100 - 200

TABLE 9k

Land for industrial development: 1966

acres

Area	Undeveloped land covered by a planning commitment		Other land known to be owned by existing firms and statutory undertakers
	Total	Known to be owned by existing firms, private developers, statutory undertakers and local authorities	
Hull, Ferriby and Brough	1,840	1,330	490
Goole	60	60	—
Beverley	90	10	—
North bank	1,990	1,400	490
Grimsby-Cleethorpes	470	150	—
East Halton Skitter—Great Coates	4,830	3,420	100
Goxhill—South Ferriby	20	10	—
Scunthorpe, Brigg and Trentside	790	460	—
South bank	5,910	4,040	100
Humberside—total	7,900	5,440	590

Land with commitments for industrial development

9.B5. Nearly B,000 acres in the Area are subject to some form of planning commitment covering their eventual development for industrial purposes, i.e., by way of planning permission or allocation in statutory or non-statutory plans: 5,400 acres of these are already in the ownership of industry, estate developers, statutory undertakers and local authorities. Another 600 acres, outside the areas presently accepted for industrial development, are known to be owned by industry or by statutory undertakers. The general distribution of these possible new industrial areas is set out in Table 9k: the largest commitments are on the south bank from Great Coates northwards.

9.88. Nearly 2,200 acres are available in existing or proposed industrial estates, including local authority estates (of which there are 13 in the Area), the Worsley-Parkinson estate at Immingham, which is the only private enterprise estate affording a full range of services to prospective industrialists, and the four Dock Board estates. Half this acreage is on the north bank, though the main local authority estate for the Hull area, 265 acres at Sutton Road, will not be ready for development until the 1970s. On the south bank the estates north of Grimsby are likely to be attractive mainly to specialised industries, which makes it particularly difficult to predict their rate of development. The same consideration applies to the 1,100 acres available within the dock estates where the Board is interested in developments that can use port facilities. The main development in prospect there derives from the agreement by BP Chemicals (UK) Ltd. (formerly Distillers) to develop the remainder of the Dock's Board land between Salt End and Hedon.

9.67. Beyond those estates not all the potential industrial land is freely available, since over 3,000 acres are known to be owned by existing industries and over 700 acres by the Central Electricity Generating Board (CEGB). Over 3,000 acres of these pre-empted sites are on the south bank where large firms have substantial areas of reserve land for expansion, and the CEGB has a site for a large power station.

9.88. Not only are large areas of estuarial land on the south bank thus already 'locked up', but the proposed power station site, together with the refineries now under construction, entirely surround the remaining undeveloped areas with deep-water frontage north-west of the Immingham Dock Estate. Most of this land (see Fig. 3) is already owned by the oil companies. It is the only land upon which it would be possible to construct any major extensions of the Immingham enclosed dock system, as distinct from any further development of riverside quays and jetties. At present there are firm plans only for a comparatively small extension of one arm of the existing docks. Coal storage and jetty facilities which are being built for the National Coal Board would also be capable of handling incoming ore with bulk carriers of up to 45,000 tons.

9.89. The total undeveloped industrial land in the Area might provide as many as 100,000 manufacturing jobs, which is very much greater than the growth of manufacturing employment up to 19B1 forecast in Chapter 10. The supply of industrial land is therefore far in excess of the likely requirements without planned growth.

Town centres

9.90. Central area facilities are important elements in the life of any town or city and their provision is important in planned development. We have therefore examined carefully the development plans for the central areas of the existing towns and assessed their prospects of expansion.

9.91. Humberside has only three large towns. Table 9A,1 compares these in terms of rateable values and types of shopping centre with other towns in England and Wales. Hull has functions on much the same scale as a number of sub-regional centres in other parts of the country, for example, Coventry, Wolverhampton and Derby, although part of its commercial activities are based on its importance as a port. Grimsby and Scunthorpe provide their inhabitants and the surrounding area with commercial services, shops and other facilities which are broadly similar in range and scale to those of York, Doncaster and Lincoln—three towns located just beyond the thinly populated belt of country which surrounds the Area.

9.92. Within Humberside shops and commercial offices are concentrated in Hull with Haltemprice, and in Grimsby with Cleethorpes, and Scunthorpe. The shopping and office centres at the county town of Beverley and the port of Goole are very much smaller. The general distribution of shops and offices is summarised in Table 9l in terms of rateable values.

TABLE 9l

Rateable value distribution of shops and offices, Humberside April 1966

%

Area	Shops and markets	Commercial offices
Hull and Haltemprice	52	56
Grimsby-Cleethorpes	22	28
Scunthorpe	15	6
Beverley and Goole	4	3
Remainder	7	4
Total: Humberside	100	100
Value £ million	£2·7	£0·4

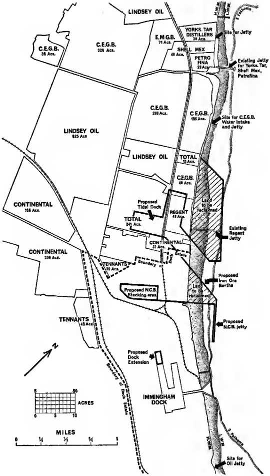

Figure 3 South Humber bank

The main channel runs close to the south bank for about four miles from Immingham Dock upstream. All the land fronting this length of the Humber is in industrial, etc. ownership. The sketch plan indicates one way in which the areas that remain between the existing Dock Estate, the new oil refineries and the power station site might be developed. The hypothetical proposals illustrated are for a new tidal dock and for land reclamation behind new riverside berths.

9.93. Among the small towns, Brigg, located where a low ridge affords a crossing point over the Ancholme, and Great Driffield on the River Hull just outside the Study Area, both retain distinctive market town functions. At the 1961 census of distribution they recorded a retail turnover per head of resident population well above the local average (£238 at Brigg and £287 at Great Driffield)—this is characteristic of small country market towns serving a relatively large rural population. Barton-upon-Humber, Hornsea and Withernsea, in spite of the holiday role of the two latter towns, recorded only average figures of retail turnover per head.

9.94. The three main centres, Hull, Grimsby and Scunthorpe, have plans, including approved Comprehensive Development Areas, for improving and expanding their central areas. There are also local proposals for the centre of Beverley which, although not a major centre, has special importance because of its historical interest.

Hull central area

9.95. The historic centre of Hull—the area known as the Old Town—still retains a separate physical and functional identity with a medieval street pattern and many unused or semi-derelict buildings. It is defined by the Rivers Hull and Humber on the east and south, and to the north and west by the area of the old town docks system which was constructed along the lines of the moated walls of the medieval city. One of these, Queen's Dock, was filled and laid out as gardens in the 1930s. The central area of the city now spreads beyond the docks to the north and west, but is still contained by the rivers on the other two sides although two opening bridges have been built over the River Hull. The central area now gradually shades out into wide areas of mixed uses.

9.96. During the second world war half the central area shops, including five department stores, were destroyed in air raids. A Declaratory Order made under the Town and Country Planning Act 1944 covered 212 acres. Subsequently an area of 201 acres was defined as an Area of Comprehensive Development. Since reconstruction began in 1950, about one million square feet of shopping floor space and nearly half a million square feet of office floor space have been built. Total expenditure on the central area between 1950 and 1965 amounted to over £11½ million—£8½ million on commercial projects and £3 million on public projects. In and near the city centre there is a range of the facilities associated with a major sub-regional centre, specialised shops, places of entertainment including a concert hall and theatre, and the services required by business, commercial and industrial firms. The central area is now clearly performing the higher order functions appropriate to its location, while much of the day-to-day shopping is being catered for by the substantial district centres in the outlying local authority housing estates.

9.97. Within the city centre the Comprehensive Development Area and the Old Town together cover some 300 acres and the town docks separating the two occupy a further 40 acres which could eventually be used for central area purposes. A broad assessment of the potential within these areas suggests that about a hundred acres could be made available for development or redevelopment. Beyond this there are extensive areas of housing scheduled for clearance over the next 15 years from which, if necessary, additional areas for commercial and shopping purposes could be secured if a decision to expand the central area were made in time.

9.98. In terms of physical space, which in major city centres is normally a very valuable commodity, the central area of Hull has therefore quite exceptional potential. If there is a major difficulty it is more likely to be traffic congestion, but much could be achieved by removing the dock traffic from the city centre. There are proposals in the Ministry of Transport's road programme and its preparation pool for doing this, including a new bridge over the River Hull linking the Hessle Road to the Hedon Road via new and improved roads south of the city centre. These, with related proposals for improving the radial roads and providing a new western approach from Hessle, will be evaluated during the current land-use/transportation survey. In the meantime the City Council has refrained from formally bringing up to date the planning proposals incorporated in the 1954 Comprehensive Development Area Map. Thus while Hull has already a substantial and, in some respects, modern city centre there are, at the moment, options permitting ready adjustments to decisions on the future of Humberside and the role chosen for Hull.

Grimsby central area

9.99. Grimsby central area falls into two parts; the Freeman Street and the Victoria Street areas, which are about 500 yards apart and separated by a level crossing and industrial properties. The County Borough Council has advanced plans for the redevelopment of both areas.

9.100. In recent years the Freeman Street area, which was excluded from the central area definition in the 1861 census of distribution, has grown substantially by the building of new stores and a new street market. There are carefully worked out plans for concentrating the central area shops in a 700-yard stretch which will be restricted to pedestrian use. Further expansion of this area would be limited on the west by the railway and by Railway Street, which is now being widened to 50 feet, and on the east by newly built or proposed high-density residential building. The total area within such a consolidated central area is about 300 acres, which at present is far from fully developed. Almost half the existing frontages are capable of more intensive use for shopping, and a development company has permission to build a further 46 shops. The Council has plans for building seven multi-storey car parks for 4,000 cars.

8.101. The Victoria Street centre has failed to keep pace with the new building in Freeman Street and its older parts look run down. However the County Borough Council has recently secured confirmation of a Comprehensive Development Area. Its radical redevelopment plans for the area hinge on constructing a high-level primary distributor along the general line of Cartergate and West Haven, designed to take the through-traffic from Victoria Street. This will effectively contain any future expansion to the west and north; to the east and south the central area is hemmed in by railways and substantial industrial properties. The total area amounts to some 30 acres and within this there is planning permission for 60 new shops and parking proposals for 5,000 cars.

9.102. Access to the central areas will be improved by the road works due to start soon on the Bargate, from the junction of the trunk roads A18 and A16 at Fryston Corner. Fryston Corner will remain a major focal point in the traffic system and if there is any material increase in population in the area a grade-separated junction, for which there is the necessary space, will almost certainly be needed. There are also longer-term local proposals for a ring road round the edge of the present built-up area, which could relieve Fryston Corner of most of the Cleethorpes holiday traffic. The results of a land-use/transportation survey at present under way, will enable the road proposals within Grimsby and Cleethorpes to be evaluated and assessments made of the effects upon them of any expansion of population in South Humberside.

9.103. When the plans for the twin centres are realised Grimsby's shopping facilities will have been transformed. With the background interest provided by the docks and the nearness of day-visitor outlets at Cleethorpes, Grimsby could become an increasing attraction to any nearby residential areas, particularly for weekend family shopping. The extent to which it might be feasible to expand the central area even further depends in part on the results of the traffic studies. However both centres have major physical features on their peripheries which rigidly confine their maximum size and would thus limit the catchment population they could serve.

Scunthorpe central area

9.104. Although Scunthorpe's rapid growth has been mainly southwards, to the extent that there is now a larger population living south of the 1933 bypass (A18) than in the older parts of the town, the central areas have remained in and around the High Street and an important subsidiary shopping centre has developed further south at Ashby.

9.105. The existing central area has a simple grid pattern, with the High Street forming an east-west spine. Current proposals concentrate the shopping and most of its associated parking and business use in an area bounded generally by the line of West Street to the north and Mary Street to the south. The eastern end is within a Comprehensive Development Area, for which there are plans for a shopping precinct and general market together with a new bus station. Along the rest of the High Street the shopping area could eventually be extended in depth into areas at present occupied by terraced houses; also a number of the shops are converted domestic premises with scope for intensified use when redeveloped. The only through-route of importance at Scunthorpe is the A18, which passes well south of the High Street. The limited amount of through-traffic using the town centre can be excluded once the eastern section of the inner ring road system is complete. It is proposed ultimately to make an 800-yard length of the High Street into a pedestrian shopping street. This would be on broadly the same scale as Freeman Street in Grimsby. If the demand for central area facilities at Scunthorpe increased, the existence of the ancillary centre at Ashby would, by catering for convenience shopping, enable the High Street area to concentrate on more specialised central area functions.

9.106. But despite its central area having expansion possibilities Scunthorpe has a topographically restricted hinterland, with the Trent valley to the west and the steel plants, ore workings and Ancholme valley to the east. Although the town is well endowed with a civic centre, central park, theatre and other civic amenities, the evidence of the 1961 census of distribution was that its shops drew relatively little trade from surrounding areas

Beverley

9.107. Beverley ranks much lower as a centre than Hull, Grimsby or Scunthorpe, but calls for special consideration because of its historical and architectural importance. The most interesting parts of the town are grouped about a mile-long stretch (largely part of the trunk road A1079) from the Minster north to New Walk. This is a recognised route for traffic from Hull and the Hull docks to the north. A one-way system speeds traffic through the town's old narrow streets and its famous market places; traffic has to pass through the narrow ancient gateway at the North Bar.

9.108. A dual two-lane bypass for Beverley is in the Ministry of Transport preparation pool. Once the full length of this, linking the A1079 near Bishop Burton with the A164 and with the A1079 north of Hull, is opened, much of the commercial traffic will be diverted from the old town centre. There are also local proposals for some extension of shopping areas which might eventually increase by perhaps one-half the total shopping frontage in the middle of Beverley.

9.109. The town itself is hemmed in eastwards by the flood plain of the River Hull and northwards by the Royal Air Force station at Leconfield. To the west the Westwood and the Hurn—the latter the site of the race course—form an attractive area of semi-wild parkland. The possible residential growth within these limits, from the present 17,000 to perhaps 26,000, would not necessarily be out of scale with the old town centre once heavy traffic has been diverted to the bypass.

9.110. Whether Beverley could expand beyond this and retain its present atmosphere and setting for its historic buildings is doubtful. The very large shops, which a major centre must have, rarely sit happily in an essentially small town scene; nor is a planned transfer of the shopping centre necessarily right if this robs the old town of its market and other traditional central place functions. On this count Beverley cannot be regarded as potentially able to provide central area facilities for a very large increase of population in its vicinity.

Communications

Ports

9.111. There are four Humberside ports; Hull, Grimsby, Goole, and Immingham, each of which has grown more or less independently of the others. Because of their independent commercial specialisations and the distances between them, the traffic facilities and prospective development of each are described. The trend will be for the Humberside ports to become a single operational unit. They are all owned by the British Transport Docks Board which, under the Humber Harbour Reorganisation Scheme, also took over the functions of the Humber Conservancy Board, thereby becoming the sole estuarial authority for the Humber.

9.112. The only available detailed study of the origin and destination of British port commodity traffic (i.e. excluding fuels) is the Martech Report*. According to this, European trade formed a higher proportion of Humberside's commodity traffic than either the country's ports as a whole or the Port of London in particular—see Table 9C.1. Over 80 per cent of Humberside's imports appeared to be destined for the East and West Ridings or the Midlands, and 15-20 per cent in the north-west.

9.113. Humberside's relative position among British and EEC ports in terms of tonnage handled is shown in Figure 4 for which the figures relate to 1965 and include fuel traffic. A broad picture of Humberside trade between 1956 and 1966 is given in Table 9C.2.

9.114. Capital expenditure by the British Transport Docks Board at Hull and Immingham in 1961-66 was about £25 million. The Board is planning, subject to approval, to invest some £20 million in new construction in all the Humberside ports over the period 1967-70, about one-eighth of the total investment in all ports in Great Britain.

9.115. Port facilities on Humberside generally, and at Hull in particular, are modern and efficient. For non-bulk traffic, the existence of a wide range of shipping services especially for Europe, with the rapid development of roll-on/roll-off and unit loads, offers great advantages for industries wanting quick and reliable through-access to continental markets. Present plans for dock extension are compatible with Humberside's growing European traffic and the concentration of oceanic trades on other ports. The major extension of the King George dock at Hull will, for example, provide modern facilities for conventional deep-sea services, and facilities for short-sea unit loads are developing fast. But there are no proposals to provide deep-sea container services from the Humber in rivalry with Tilbury, Southampton or even Felixstowe.

8.116. Both Hull and Grimsby are traditional fishing ports and each handles about 200,000 tons of fish annually. Hull's St. Andrews dock is used by the distant water section of the fishing industry, which includes a fleet of modern freezer trawlers and which specialises in cod. It is the largest deep-sea fishing port in the country. The fishing fleet at Grimsby consists of near, middle and distant water trawlers, including freezer trawlers, and also a fleet of seiners. Though cod comprises the greater volume of landings, Grimsby also specialise in flat fish and other high-value catches

Hull

8.117. Hull ranks as Britain's third seaport in terms of value of goods handled; in terms of tonnage it is sixth, or ninth if fuels are included. In line with the national pattern Hull's import tonnages of dry cargo have been about three times as large as export tonnages. Growth in traffic has been small, 4½ per cent between 1956 and 1966 compared with an increase of 30 per cent to 40 per cent in total trade to all United Kingdom ports. The trade of the port was notably affected by the decline in coal shipments (which have now ceased) and the changing pattern of the oil trade. Excluding even these changes, Hull's share of foreign and coastwise trade has declined. One contributory factor has been the port's relatively small trade in finished manufactures during a period when they accounted for a large part of the expansion of Britain's trade.

9.118. Almost all the shipping movements in foreign trade are on European routes, though there is a limited number of secure deep-sea trades, e.g. grain. Foodstuffs and basic materials make up half the foreign traffic in roughly equal proportions. There are now five roll-on/roll-off installations as well as the passenger terminal, and container-handling facilities are being provided. Over the last 18 months there has been an improvement in Hull's share of the national trade in manufactured goods, due perhaps to increased competitiveness with other ports resulting from these developments. Using liner trains for the cross-country haul, the British Steel Corporation has recently started to export substantial quantities of sheet steel from Newport, Monmouthshire, via Hull to Scandinavia, and Hull is also now a port of departure for nickel exports from

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* *Britain's Foreign Trade.* Report by Martech Consultants Ltd. for the Port of London Authority. St. Clements Fosh & Cross Ltd., London, 1965.

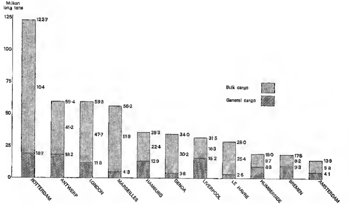

Figure 4 British and EEC port traffic: 1965

the Swansea area. There are also signs of Hull becoming a port of transit for exports from the north-west bound for Rotterdam. These modern extensions of the port's activities can be expected to continue developing in view of the steady increase in European trade and the rapid increase in the use of roll-on/roll-off and container services. Nevertheless rapidly rising productivity has led to a steady reduction in port employment.

Immingham

9.119. In contrast to Hull the traffic at Immingham is fairly evenly balanced between inward and outward movement. Mainly it is highly specialised:

- *a* *Petroleum.* This traffic is carried on at jetties outside the enclosed docks. A new large oil jetty is under construction.
- *b* *Ores, coal and crude fertilisers.* The dock is particularly well equipped to handle bulk cargoes and possesses specialised bulk-loading apparatus. The National Coal Board intends to make one of its major coal export points at Immingham by developing new coal-loading installations outside the docks.

There is in addition a roll-on/roll-off terminal which operates services to Gothenburg and Amsterdam.

Grimsby

9.120. Grimsby is predominantly a fishing port; its total traffic is only about one-tenth of Hull's. Its general cargo is foodstuffs and timber and there is a roll-on/roll-off service to Esbjerg, Denmark. Since 1948 over £2 million has been spent on improvements including the modernisation completed in 1966. No radical change in the scale of Grimsby port activities is envisaged.

Goole

9.121. Nearly two-thirds of the tonnage shipped out of Goole is coal and other solid fuels for use in power stations and domestically in southern England. The timber handled is, however, higher in value terms. A wide range of miscellaneous traffic is also carried in small vessels and there is a roll-on/roll-off service. While the level of Goole's trade is unlikely to grow, it will continue to handle a variety of traffic in small seagoing vessels, the use of which is expected to continue. Its inland position enables lorries to make two trips between the West Riding cities and the docks in a single day.

Inland waterways

9.122. The inland waterways of the Humber Basin, the Aire and Calder Navigation, the Sheffield and South Yorkshire Navigation, the Trent Navigation and the Ouse Navigation as well as the Humber itself, still carry valuable traffic between the Humberside ports and the West Yorkshire and East Midland cities. There are close operational links by waterborne traffic between Hull and Goole. A particular feature of the ports of Hull, Grimsby and Immingham is the free overside loading and discharging between inland and seagoing vessels in the docks.

9.123. The waterway system of Humberside is important because it carries about half the total waterway traffic of Great Britain. The proportion of Humberside traffic carried by waterway is much higher than for other ports. Goole is accessible to seagoing ships of up to 2,400 tons, and tankers of up to 500 tons can reach Leeds by canal. The level of traffic carried will decline rather than increase. The improvement of the system to European standards, for example to take 1,300 ton vessels generally and pusher trains, does not seem to be feasible.

Railways

9.124. The railway system of Humberside has developed in two principal groups of east-west railway services linking each bank with the main national railway network. See Map 15.

- a On the north bank Hull is connected for passengers and goods to the main north-south railway system both through Selby and through Goole. There are regular through passenger services from Leeds, Sheffield, Manchester, Liverpool and London. In addition there is a line from Hull to Beverley, Bridlington and Scarborough.
- *b* On the south bank there are two main lines from Grimsby, one west and the other south. The west leading line splits into three at Barnetby, serving Scunthorpe/Doncaster, Retford/Sheffield and Lincoln/Newark. The south leading line links Grimsby to Peterborough via Louth and Spalding.

9.125. The railway system serving the Humberside ports before the modernisation measures of the last decade had an extensive network of sidings and dockside yards. As a result of the freight rationalisation programme, the railways have increasingly concentrated on bulk goods, such as iron ore, and the Railways Board will continue to handle this traffic under the provisions of the Transport Act 1968. From 1st

January 1969, the marketing of sundries and freight liner services will be the responsibility of National Freight Corporation subsidiaries. The new sundries company will continue the work of rationalising the network of services and depots.

9.126. Important changes have been proposed in the general pattern of rail services on Humberside as part of the reshaping policy of British Railways. The *Network for Development Map* published in March 1967 indicated that the withdrawal of the following passenger services would be considered:

- a Hull to Scarborough.
- *b* Grimsby to Peterborough, Lincoln to Skegness (via Woodhall) and to Mablethorpe.
- *c* the branch lines to Immingham Docks, New Holland and Barton-upon-Humber.

Decisions by the Minister of Transport on all three cases are expected shortly.

Inter-urban roads

9.127. Map 16 shows the main road system of Humberside as it is envisaged after the completion of the announced road programme and preparation pools.

The present situation

9.128. The road system which links Humberside to the Great North Road (A1) and the major centres of England can be regarded as split into two distinct parts by the River Ouse and the River Humber:

- *a* The lowest road crossing of the water barrier is via Boothferry Bridge near Goole, which is 23 miles west of Hull and 36 miles west of Grimsby. The bridge is a swing bridge at which shipping has precedence, although there are not in practice daily openings to navigation.
- *b* The next lowest crossing of the water barrier is at Selby. This road bridge is of wood and privately owned. It is subject to tolls authorised originally under an 19th century turnpike Act.

9.129. On the north side of the Humber the main roads to Hull are the trunk roads A614 and A63. These are heavily overloaded, especially the A614. Over 30 per cent of the traffic is composed of heavy lorries, which puts the roads in the category of major industrial routes. South of the Humber the trunk road A18 connects Scunthorpe and Grimsby to the A1 and the major centres. It is increasingly overloaded on both sides of Scunthorpe and carries over 26 per cent of heavy lorries, thus being only a little less important industrially than the north bank roads. The other roads of Humberside—the A1079 trunk road from York to Hull and the principal roads south from Scunthorpe and Grimsby to Lincoln—are already overloaded. This is because they are little more than rural main roads. In the absence of a major road crossing the Humber on the lower estuary, however, the traffic on these roads is unlikely to grow sufficiently to justify more than bypasses of built-up areas on the routes.

The road programme

9.130. The Ministry of Transport's plans for trunk road links between A1 and Humberside are contained in:

- a the announced road programme for the period up to 1970. The schemes in this are scheduled to start in particular years;
- *b* the first preparation pool (announced in February 1967) from which schemes will be selected for the programme for the early 1970s;
- *c* the second preparation pool (announced in April 1968) for schemes to extend *b*.

Schemes in the preparation pools are not scheduled for particular years. Further announcements have yet to be made concerning the inclusion of schemes to complete the £1,000 million trunk road improvement plan for the 1970s.

9.131. The plan as already announced will provide the following:

- a a new motorway from the A1 to Gilberdyke on the road to Hull. This will be part of the Liverpool to Hull motorway (M62);
- *b* a new motorway linking the M18/A1(M) junction south of Doncaster, via Thorne, to the M62 at East Cowick. This is often called the M18 Doncaster Spur Extension;
- *c* an improved trunk road from the M18 Doncaster Spur Extension at Thorne as far as Scunthorpe, including a new bridge over the Trent at Keadby;
- *d* a bypass of Brigg

improvements of the road from Gilberdyke to Hull and of the A18 from Grimsby westwards are under consideration for the future announcements referred to in para. 9.130.

9.132. When the roads in the announced road programme and in the present preparation pools have all been completed the Humberside Area will be well on the way to having a modern road system, with substantially more capacity in relation to demand than many other parts of the country. So far as the north bank is concerned road transport from Hull will be able to travel very quickly to the main motorway network of the country with ready access through the Spur extension (M18) to the M1 and via the M62 to Liverpool. This linking of the two major ports of Liverpool and Hull by the M62 is particularly significant.

9.133. The south bank will also have ready access to the country's main road network from the new Keadby Bridge. The present bridge is a bottleneck and should be brought forward into the road programme. The roads east of Keadby will remain largely unimproved, with very inadequate width and poor alignment for modern traffic. Nevertheless they are flat and the present traffic on them is light, so they should be able to take some increase without serious congestion. The position will however have to be watched, particularly as heavy traffic from the Immingham area builds up, and further improvements will have to be incorporated in later preparation pools with the needs of major development borne in mind. (See para. 4.90.)

Urban transport

9.134. Two land-use/transportation surveys are being carried out: for Hull and Haltemprice, and Grimsby, Cleethorpes and Immingham. The findings of these will need to be taken into account when the main recommendations of this Study fall to be implemented.

9.135. The traffic and transport systems of all the Humberside towns show in varying degrees the problems of congestion that characterise urban settlements built before the advent of motor transport. The Hull Town Map provides for a major city relief road part of which is already programmed (see para. 8.98). This will go a long way to relieve Hull's particularly difficult dock traffic problems. Further local road improvements are planned in Hull and the other towns. Improvement to the traffic and parking situations in town centres should be obtained as a result of the traffic and transport plans which the Ministry of Transport has requested local authorities to make for the period up to the mid-1970s. Action on this scale would not, of course, be adequate for major planned expansion on Humberside.

Lower Humber crossing

9.136. At present the only direct transport between the north and south banks of the Humber is the ferry service operated by British Railways between New Holland and Hull. This uses three paddle steamers, each of which can carry up to 900 passengers and 20 vehicles per trip, but there is a weight limit of two tons per vehicle because of the presence of mud shoals near the south bank. In 1966 the ferry was used by some 860,000 passengers and 80,000 motor vehicles. This compares with a total of over 18 million vehicles using the Mersey Tunnel

9.137. The ferry operates 14 services in each direction on weekdays and six on Sundays. There are additional services in the summer. According to the timetable the crossing takes about 20 minutes but this excludes the time taken to load and offload, and any waiting for the ferry or at the ticket barrier. Even on a clear day ferry times are made uncertain by tides; in poor weather ferries may be suspended altogether.

9.138. Both the regional Economic Planning Council and British Railways are dissatisfied with the existing crossing services and are co-operating in studies to improve them. A hovercraft could save 15 minutes in journey time and this could generate a 30 per cent increase in vehicle traffic and over 80 per cent increase in passengers. The savings in time for a hovercraft service directly between Grimsby and Hull would be much greater. The volume of commercial traffic that a suitable hovercraft would generate has not yet been forecast. Whether such a traffic link is either practicable or economic remains to be determined.

Aerodrome developments

9.139 The disposition of airfields on Humberside, both civil and military, is shown on Map 17. The only civil airport in the Area is Brough, 11 miles west of Hull. This, however, will no longer be available for normal commercial operations when the tall chimneys for a nearby smelter have been built, following the decision, on appeal, by the Minister of Housing and Local Government. The Area's nearest civil airport in the short term, therefore, will be Yeadon, four miles north-west of Leeds. There are however private airstrips at Scunthorpe and Thorngumbald, a helicopter station at Tetney and service airfields, some of which can be made available for civil use.

9.140 Before the decision on Brough a report commissioned by a committee of local authorities and other interests reached the following conclusions on aerodrome requirements in this part of the country*:

- *a* the need until the late 1970s could be met by developing Yeadon and Brough, extending the former to take jet aircraft immediately and Brough later;
- *b* further airports for airline operations will not be needed for some time;
- *c* competition from surface transport will affect the growth of the region's air traffic, except for overseas flights;
- *d* in the late 1970s the development of Brough and Yeadon should be checked and a new intercontinental terminal, in the vicinity of Goole, established;
- *e* sites for general aviation (Todwick and Kirmington) would be desirable; others may also be needed;
- *f* wider use of military airfields by civil aircraft should be considered.

9.141. These recommendations form the basis for current discussion of regional airfield planning (see Map 16), but they were made on the assumption that Brough would be available for civil transport operations. The present position is as follows: the possibility of extending the civil use of RAF Leconfield is being explored; planning permission is about to be sought for extending the main runway at Yeadon; Kirmington is to be developed as proposed, but not Todwick; and Pocklington is already available. The proposal for a major international terminal by 1980 will need to be kept under review in the light of the developing air transport situation; the local authorities are taking steps to earmark a possible site in the Goole area as a precautionary measure.

Education

Primary and secondary education

9.142. Since the second world war, on North Humberside, Hull has had to face the problem of some old schools in the older parts of the town and new building in peripheral estates. Some substantial progress has been made with secondary school building and there are already some big purpose-built comprehensive schools. Outside the county borough the primary and secondary schools are generally very good with reorganisation progressing towards a comprehensive system; there is a tradition of staying on at school well beyond the minimum leaving age.

9.143. On the south bank growth of population at Scunthorpe and in dormitory villages around Grimsby and Immingham has called for a heavy school building programme by Lindsey County Council. Organisation of secondary education in the rural areas is more complex because of the thinly scattered population. In Grimsby arrangements were at one time made for pupils from certain secondary schools to continue their full-time education beyond statutory school-leaving age at the college of technology, but the local education

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* *An airport programme for Yorkshire and Humberside, 1967.* A. Stratford & Associates Nicholson House, Maidenhead, Berkshire.

TABLE 9m

Primary and secondary schooling on Humberside

%

Local education authority	Oversize classes January 1967		Pupils above the minimum leaving age January 1966			
	primary	secondary	age 16		age 17	
	oversize* classes for registration purposes	oversize* classes as taught	boys	girls	boys	girls
(1)	(2)	(3)	(4)	(5)	(6)	(7)
East Riding	2·1	24·3	31·6	33·4	24·7′	17·7
Lindsey	12·6	23·4	26·2	25·7	14·5	12·1
Kingston upon Hull	17·7	23·4	19·2	19·0	11·4	6·4
Grimsby	20·5	20·1	16·6	17·5	9·3	7·2
England and Wales	11·6	25·4	26·7	25·0	14·4	12·4

Note: Columns 4-7 give the numbers aged 16-17 in secondary schools as a percentage of the numbers aged 13 respectively three and four years previously.

* Exceeding 40 pupils per class in junior primary school classes and 30 pupils per class in nursery, senior primary and secondary school classes.

Source: Department of Education and Science

TABLE 9n

*Payments to and from local education authorities academic year 1966–67

£

To / From	Kingston upon Hull CBC	East Riding CC	Grimsby CBC	Lindsey CC	Lincoln CBC	York CBC
Kingston upon Hull CBC	—	4,556	—	—	—	632
East Riding CC	163,671	—	33	—	—	32,930
Grimsby CBC	99	—	—	2,207	1,626	—
Lindsey CC	2,796	—	123,651	—	53,513	—

* The payments relate to students taking lower level courses (e.g. City and Guilds, 'O' and 'A' level GCE, ONC and OND). Advanced courses (e.g. HNC, HND and those leading to certain professional qualifications) are charged to the further education pool.

authority is now able to offer courses in its secondary schools to all pupils wishing to remain.

9.144. Altogether there are no serious shortcomings in the Area's educational facilities which could be crucial in the present context. Some comparisons of the position on Humberside with England and Wales are given in Table 9m. Expansion of facilities could be expected to match any normal growth of residential areas. In fact on the south bank an increase of population and of financial resources would probably benefit the area. There are no grounds for anyone to fear that a move into Humberside would jeopardise educational chances. Indeed the opportunities in primary and secondary schooling in the East Riding are much above average.

Further and higher education

9.145. A university and colleges of further education are significant elements in the infrastructure of any area. Successful establishments are an important influence on the economy and social and cultural life of the community.

9.146. The University of Hull has grown rapidly in recent years with the completion of new buildings and halls of residence. It now has about 3,500 students, and current plans allow for 4,000. There are faculties of pure science, applied science, arts, and social studies, but no engineering faculty. The setting up of a medical school is being discussed. Sheffield, York and Nottingham Universities are also within easy reach.

9.147. In addition over 2,000 students were taking full-time courses at other major establishments of further education in or adjoining the Area in the academic year 1966-67: about 10,300 were released by their employers to take part-time day courses, and a further 4,600 were following evening courses leading to recognised qualifications. Over 8,000 students also enrolled for mainly recreational evening courses.

9.148. On North Humberside the main facilities, other than for training in agriculture, are in Hull. An important centre of further education is being built around the modern College of Technology where new building is in train for the College of Commerce, College of Art, and the Nautical College. Some four or five acres of additional land could be provided for buildings beyond those already allowed for. This campus on the edge of the city centre affords a substantial and well-placed basis for the development of further education on North Humberside.

9.149. On South Humberside the Grimsby College of Technology is in postwar buildings, with extensions in progress. It occupies a 23-acre site at Fryston Corner, a focal point in the district's road communications. It recruits nationally for industrial chemistry and nautical training. The North Lindsey Technical College at Scunthorpe is also housed in modern buildings and occupies about 10 acres of an extensive education site adjoining the trunk road A18. Both these establishments are capable of expansion. In addition the steel industry does much of its own technical training.

9.150. There is thus on each bank a firm base for expanding further education facilities. But the absence of convenient river crossings impedes interchange of their use. The virtual absence of cross-river pooling of resources is highlighted in Table 9n.

Health

9.151. The health of a population is affected by a complex of interacting factors: climate; air pollution; housing conditions, the standards of local medical services; incomes; occupational hazards, local economic and social history, etc. A specialised study of conditions on Humberside would take a considerable time and the results would not all necessarily be relevant to a feasibility study. Our main concern in this context is to consider whether Humberside has:

a the physical characteristics within which modern development could be expected to provide a healthy environment;

b an infrastructure of basic medical services which could readily be expanded to cater for new populations.

Some physical characteristics of Humberside

9.152. It is usually accepted that air pollution is the most harmful of the external conditions to affect health. A major source in densely built-up areas is the domestic fire, which produces quantities of sulphur dioxide from chimneys too low to encourage dispersal. This can lead to the formation of smog in anti-cyclonic conditions, particularly in valleys and low-lying areas. Of the three largest local authorities in Humberside, Scunthorpe alone is currently making Smoke Control Orders. The Borough is not on the Ministry of Housing and Local Government's provisional list of 'black areas', nor is Grimsby County Borough, although no Orders have yet been made for this area. By October 1963 Orders had been made covering about 29,000 premises in Kingston upon Hull County Borough, but no Orders have been made since and the area is listed as a 'black area'.

9.153. In some cases industrial processes may be locally serious, perhaps because of smell or dust, although there is public control of potentially harmful emissions. The largest source of pollution is the Scunthorpe steel works. The most frequent wind directions are westerly, so that the effect on the town itself is reduced. East of the steel-works there are extensive woodlands which trap some of the pollution: this and the topography protect, for example, Broughton. On the south Humber bank the prevailing westerlies carry emissions from the large plants over the estuary: the north-easterly winds are often strong and they then tend to disperse pollution. The industrial areas in Hull, particularly those along the sides of the River Hull, also produce some atmospheric pollution, which tends mostly to affect the east side of the city.

9.154. The effects of climate, topography and soil conditions on health are not decisive, but for some conditions of ill-health it may be better to avoid cold, damp areas. In this respect Humberside has a low rainfall and a good temperature and sunshine record, even though it is not quite as warm as the south coast. Parts of Humberside are exposed, but even in these places there is no question of any health hazard. The effects are more likely to be reflected in heating costs and the occasional incidence of boisterous and uncomfortable conditions. Similarly the effects of topography are modified by large-scale urban development. For example the low-lying areas around the River Hull which repelled settlement until the last hundred years have been drained and absorbed in city development. But even in their natural state the free-draining soils of the Wolds, for example, offer a warm and dry physical environment. Coupled with a favourable climate and the fact that the area is some 50 miles from any major urban mass producing air pollution, Humberside undoubtedly offers extensive areas that are healthy to live in.

Medical services

9.155. The most expensive physical component of an area's medical services is the hospital. Over the country as a whole, four-fifths of the total building programme up to 1990 is likely to be absorbed in replacing out-of-date facilities. On North Humberside, where the main hospitals are at Hull, Cottingham and Beverley, a major step has been completed with the opening of the new Hull Royal Infirmary on the site of the former Western General Hospital. On the south bank the major hospital centres are Grimsby and Scunthorpe, a new district general hospital is to be built at Grimsby, and the War Memorial Hospital at Scunthorpe is being progressively redeveloped. In planning these developments account could be taken of any planned population growth.

9.156. As far as catering for any future growth is concerned the need for additional hospital accommodation on Humberside is not significantly different to the position anywhere else in the country, except for the difficulties raised by the lack of an estuary crossing. This makes it impossible for any expensive new facilities on one bank to serve population increases on the other.

9.157. The situation as regards numbers of general practitioner doctors and dentists per head of population on Humberside is unremarkable. The Area shares the national shortage and provides roughly the same number as the West Midlands, but it is less well off than parts of southern England. There is some evidence of difficulty in attracting general practitioners to Hull. The Royal Commission on Medical Education has recently considered Hull as a possible place for a medical school and associated clinical teaching facilities.* Here again a Humber bridge would be important in providing an adequate supporting population.

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* *Royal Commission on Medical Education 1965-68 Report.* Cmnd. 3569. HMSO, 1968.

Mortality statistics

9.158. It is difficult to sum up shortly and adequately the general state of health of a population. Any really startling features would, however, be likely to show in the local mortality statistics. The number of deaths recorded locally is available annually for county districts. By means of an 'area comparability factor', calculated by the Registrar General, it is possible to adjust the death rate for an individual area to allow for abnormalities in the age and sex structure of its population; the comparability factor also makes allowances for the presence of certain types of hospital. Where death rates, after such adjustment, consistently depart from normal levels there is the possibility that they are to some extent a response to the area's physical environment.

9.159. Death rates for small areas are liable to fluctuate from year to year. Because of this, calculations of adjusted rates for Humberside have been made for groups of county districts and for a period of four years, 1961-64 inclusive. The results are summarised in Table 9o which also provides comparisons with areas of equivalent population in England and Wales.

9.160. The adjusted death rates for Hull and Scunthorpe are on the high side in relation to comparable size urban areas in the country as a whole. The rates for small urban areas on Humberside approximate to those of all such areas. They would show up more favourably but for the high death rates recorded for Goole, Brigg and, particularly, for Hedon. The Humberside rural districts have in general a slightly better record than rural districts in the country as a whole; the figures for the Isle of Axholme RD are slightly higher than other rural districts in the Area. However this detailed variation, as noted for Hedon, Goole and Brigg, is for a very small area and may not be statistically significant. Altogether the Area shows no striking departures from the average and the picture outside the main industrial towns is mostly satisfactory. The Area certainly shows up well by comparison with the West Yorkshire conurbation where the adjusted death rate was 13·8 per thousand.

TABLE 9o

Death rates 1961–64 inclusive

Item	Adjusted death rate per 1,000 home population
All urban areas outside conurbations, with populations of 100,000 and over	
England and Wales	12·9
Hull and Haltemprice (population 345,400)	13·3
Grimsby-Cleethorpes (population 129,300)	12·5
All urban areas outside conurbations, with populations of 50,000 and under 100,000	
England and Wales	12·2
Scunthorpe (population 68,400)	13·0
All urban areas outside conurbations, with populations of under 50,000	
England and Wales	12·4
Total for Beverley B, Driffield UD, Goole B, Hedon B, Hornsea UD, Withernsea UD, Barton UD, Brigg UD, Market Rasen UD (total population 68,000)	12·8
All rural districts	
England and Wales	11·4
Humberside (total population 177,000)	11·0

Source: Based on material supplied by the General Register Office.

Annex 9A

Humberside within a national urban hierarchy

9A.1. Humberside is a considerable distance from any other sizeable urban area. Of its population of 770,000, three-quarters are concentrated in the city of Hull (with Haltemprice) and in the two large towns of Grimsby-Cleethorpes and Scunthorpe. Table 1 represents an attempt to place these urban centres in a national and regional perspective. The criteria used relate only to retail trade and commerce, which are two of the most important urban functions.

9A.2. Table 1, columns 2-6, give rateable values of shopping and commercial uses for several towns and cities in England and Wales. Rateable values provide an up-to-date comparative index of the rent which existing facilities in each local authority area could be expected to command. This is a good measure of their commercial importance, though because assessments for rating are affected by positional values they are no direct guide to floor space. The classification of shopping centres (Table 1, column 7) is derived from the 1961 census of distribution. It relates to retail trade in the central shopping areas of each local authority area.

9A.3. Table 1 shows that England has nine local authority areas which may be regarded as having the status of provincial centres. Cardiff, the Welsh capital, would on the criteria examined also fit into this category. Three of these large cities, Leeds, Sheffield and Nottingham, are accessible to Humberside.

9A.4. Leeds, which is the government administrative centre for the Yorkshire and Humberside Region, is classified with only four other cities, Birmingham, Manchester, Liverpool and Newcastle, as a shopping centre of the highest rank outside London. The distance from Hull to Leeds by the trunk road A63 is 55 miles, though some sections of the route are slow; there is a mainline rail service and some trains are scheduled to cover city centre to city centre in one hour.

9A.5. Grimsby is 93 miles from Leeds, via some bad stretches of road and without an obviously direct route. Rail links are tenuous. South Humberside in fact has better communications with Sheffield and Nottingham than with Leeds, both being less than 75 miles from Grimsby by way of the Gainsborough and Newark crossings of the Trent. There are also direct rail services.

9A.6. Hull itself ranks as a major town or sub-regional centre, comparable to Reading or Wolverhampton and appreciably larger in central area activities than, for instance, Oxford. Grimsby and Scunthorpe are much smaller. A measure of the actual trade turnover in the towns of the Area is given in Table 2, where Hull's dominance stands out yet again.

Annex 9A–Tables

Rateable values April 1967 TABLE 9A.1

Local authority area	Total shops, offices & commercial £'000	Shops £'000	Commercial offices £'000	Commercial offices As per cent of total	Other commercial uses £'000	Classification of main shopping centre 1861 (see note 1)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
PROVINCIAL CITIES						
Birmingham	13,238	8,134	2,657	5·2	4,447	2B
Manchester	10,351	3,875	3.243	11·5	3,132	2B
Liverpool	7,577	3,783	1,629	8·0	2,185	2B
Bristol	5,998	2,943	1,044	4·9	2,011	3A(2)
Leeds	5,903	2,545	1,375	6·4	1,883	2B
Sheffield	4,848	2,495	542	2·4	1,609	2C
Nottingham	4,240	2,241	533	3·6	1,455	2C
Leicester	4,031	2,096	457	3·2	1,477	2C
Newcastle-upon-Tyne	3,766	1,804	752	6·1	1,209	2B
Cardiff	3,490	1,691	881	5·1	1,119	2C
MAJOR TOWNS						
Bournemouth	3,099	1,665	257	2·5	1,177	3A
Southampton	2,920	1,589	421	3·7	910	3A
Brighton	2,801	1,729	328	2·8	744	3A
Coventry	2,424	1,361	276	2·0	787	3A
Wolverhampton	2,338	1,288	256	2·0	784	3A
Bradford	2,287	1,208	336	3·4	742	3a
Kingston upon Hull	2,230	1,338	231	2·5	581	3A
Reading	2,125	1,140	412	5·8	573	3A
Stoke-on-Trent	2,037	1,058	239	2·5	740	3b
Luton	1,935	1,128	208	2·1	599	3a
Derby	1,909	1,100	227	3·3	582	3A
Norwich	1,847	1,041	314	5·6	492	3A
Oxford	1,789	1,005	223	3·3	561	3A
Watford	1,770	1,165	258	4·3	347	3A
Exeter	1,780	1,023	208	4·0	528	3A
TOWNS IN OR NEAR HUMBERSIDE						
York	1,069	672	139	3·7	277	3A
Doncaster	1,028	671	97	2·4	258	3A
Grimsby	978	485	114	3·1	370	3C(3)
Scunthorpe	606	418	37	0·7	151	3b
Lincoln	585	348	58	2·0	181	3B

Notes on Table 9A.1

1. The classification is devised from an analysis of:
   - *a* amount and type of trade;
   - *b* net attraction of trade from beyond the local authority area;
   - *c* provision of selected shopping facilities.

   The classification is as follows:

   2B—provincial cities of outstanding importance.
   2C—other provincial cities.
   3A—major towns of above average importance.
   3B—major towns of average importance
   3C—major towns of below average importance.

   Use of the lower case, e.g. 3b, indicates that the centre has a restricted function in relation to surrounding areas.

2. Bristol failed only marginally to qualify as a second order centre; the Severn Bridge has been built since the 1961 census.

3. The Freeman Street area was excluded from the 1961 census definition of the central shopping area. This may have depressed Grimsby's grading in this analysis.

4. Column 6 includes public houses; hotels and boarding houses; restaurants; holiday camps and caravan sites, warehouses, stores and workshops; commercial garages, petrol filling stations, airports; lock-up garages saperately assessed; advertising stations and signs; markets.

Source: Based on figures contained in *Rates and Rateable Values in England and Wales 1967-68*. HMSO 1968.

Retail trade: Humberside 1961

TABLE 9A.2

Area	Population April 1961	Turnover £'000	Turnover per head £
Hull area	345,858	57,452	166·2
Kingston upon Hull CB	303,268	54,168	178·6
Haltemprice UD	42,388	3,283	77·5
Remainder	112,428	11,660	103·7
Beverley MB	16,024	2,898	180·9
Goole MB	18,875	3,645	193·1
Hedon MB	2,338	238	101·8
Hornsea UD	5,949	943	158·5
Withernsea UD	4,963	763	153·7
Beverley RD	23,133	833	40·3
Goole RD	8,665	429	49·5
Holderness RD	20,367	833	45·8
Howden RD	12,115	878	72·5
North Humberside	458,085	69,112	150·9
Grimsby area	146,997	24,815	168·8
Grimsby CB	86,665	19,593	202·7
Cleethorpes MB	32,705	3,898	119·2
Grimsby RD	17,627	1,324	75·1
Scunthorpe MB	67,257	11,961	177·8
Remainder	73,718	6,512	88·3
Barton-upon-Humber UD	6,584	1,036	157·4
Brigg UD	4,908	1,165	237·5
Caistor RD	13,397	752	56·1
Glanford Brigg RD	34,721	2,487	71·6
Isle of Axholme RD	14,110	1,072	76·0
South Humberside	267,872	43,288	150·3
Humberside—total	746,057	112,400	150·7

Source: Based on figures contained in the 1961 Census of Distribution.

Annex 9B

Water sources 1966 and 1971

TABLE 9B.1

million gallons per day

Water undertaking	Source		1958 . Yields			1971 : Yields	
			Reliable	Licensed	Temp'y authorised	Reliable	Notes
(1)	(2)		(3)	(4)	(5)	(8)	(7)
North Lindsey Water Board	Barrow Vale	(chalk)	4·0	3·5	+0·5 till 1989	4·5	Incl. Barrow cress beds
	Barrow	(chalk)	1·3	0·8	+0·5 till 1989	0·8	
	{Thornton	(chalk)	3·0	2·0	+1·0 till 1976	3·0	Incl. 1·0 authorised till 1876
	{Bulk supply to NE Lincs. WB till 1968		−2·0	−2·0		—	
	Ulceby	(chalk)	—	—		2·0	Authorised till 1978
	Goxhill	(chalk)	—	—		1·5	Authorised till 1975
	Softening losses on chalk supplies		−0·4	−0·4		−0·4	
	Winterton Holmes	(limestone)	1·5	1·5		1·5	
	Scotney	(limestone)	0·4	0·4		0·4	
	Appleby	(limestone)	0·2	0·2		0·2	
	Redbourne	(limestone)	0·3	0·3		0·3	
	Scawby	(limestone)	0·3	0·3		0·3	
	Winterton Carr	(limestone)	—	—		0·7	Authorised till 1973
	All sources, mgd		8·5	6·6	+2·0	14·8	
North East Lincolnshire Water Board	Immingham	(chalk)	0·2	0·2		0·2	
	Habrough	(chalk)	4·0	3·0	+1·0 till 1968	3·0	
	Little London	(chalk)	4·0	3·0	+1·0 till 1968	3·0	
	Healing	(chalk)	4·5	3·5	+1·0 till 1968	3·5	
	Little Coates	(chalk)	6·0	4·5	+1·5 till 1988	4·5	
	Heneage Road	(chalk)	1·3	0·8	+0·5 till 1968	0·8	
	Weelsby	(chalk)	1·7	1·7		1·7	
	Barnoldby le Beck	(chalk)	1·2	1·2		1·2	
	Tetney	(chalk)	3·5	3·5		3·5	
	East Ravendale	(chalk)	0·1	0·1		0·1	
	Bulk supply from N Lindsey WB till 1988		2·0	2·0		—	
	Great Eau scheme		—	—		14·0	
	All sources, mgd		28·5	23·5	+5·0	35·5	
Kingston upon Hull Corporation	River Hull		12·0	12·0		12·0	
	Spring Head		3·5	3·5		3·5	
	Cottingham Mill Dam		4·5	4·5		4·5	
	Dunswell		5·5	5·5		5·5	
	Keldgate		1·2	1·2		1·2	
	All sources, mgd		25·7	26·7	—	26·7	

Source: Ministry of Housing and Local Government.

Industrial demands for water

TABLE 9B.2

million gallons per day

Water undertaking	1967	1971
North Lindsey Water Board	2·7	7·6
North East Lincolnshire Water Board	15·4	23·8
Kingston upon Hull Corporation	10·5	15·0

Annex 9C

Trade by ports excluding petroleum and other fuels, 1964

TABLE 9C.1

Port	Million tons		£ million	
	**European*	*Total*	*European*	*Total*
Imports				
London	4·7	13·5	558	1,516
Hull	1·8	3·8	165	318
Immingham	0·6	1·1	14	24
All UK Ports	19·6	48·2	1,820	4,726
Exports				
London	1·8	4·4	498	1,395
Hull	0·8	0·8	171	217
Immingham	0·06	0·08	6	8
All UK Ports	8·9	18·8	1,600	4,040

* Means EEC, EFTA, Ireland, Spain and Soviet bloc.
Source: Martech Consultants' Report.

Humberside port traffic 1956, 1961, 1966

TABLE 9C.2

Thousand tons

	1956	*1961*	*1966*
Fish	474	401	378
Coal and Coke	8,387	3,029	5,065
Petroleum	3,403	4,374	5,778
General	6,255	7,342	8,218
Total	18,519	15,146	20,439

Source: Ports and Development on Humberside, a study prepared for the Central Unit for Environmental Planning by the British Transport Docks Board.

10 AN ECONOMIC ASSESSMENT OF HUMBERSIDE

Summary of main economic features

10.1. The most significant elements in the economy of Humberside, which are described in detail in the following two sections, are:

- *i* a very important port complex on the estuary, including Hull, Grimsby, Immingham, Goole;
- *ii* large raw material processing industries on the banks of the estuary;
- *iii* a major iron and steel complex at Scunthorpe;
- *iv* important fishing and agricultural industries and associated food processing;
- *v* an under-representation of the engineering and electrical industries;
- *vi* a rapid rate of growth in employment in the Area since 1953, greater than the average for Great Britain, but showing signs of slowing down;
- *vii* a large part of total growth in employment for women, especially in the distributive trades;
- *viii* unemployment somewhat above the national average;
- *ix* low, but increasing, activity rates among women;
- *x* income levels below the regional and national average;
- *xi* high rate of natural increase of the population;
- *xii* net outward migration from North Humberside, higher than the inward migration into South Humberside, but both falling.

Past economic trends

Changes in employment

10.2. Continuous series of employment and unemployment figures for the pre- and post-war periods were not available, but fragmentary figures which are available give some indication of Humberside's position relative to Great Britain as a whole. In general, it appears that Humberside has been prone to cyclical variations in employment and unemployment to a greater degree than the country as a whole. In particular, the impact of recessions has been greater, though less severe than in the Development Areas. Post-war employment figures also indicate that recoveries from recessions have lagged behind national recoveries.

10.3. Before the second world war unemployment was above the national rate, and even in Hull, where there was some industrial growth (in flour-milling, seed-crushing, fishing and timber), unemployment was still 11 per cent in 1939; nearer to the 13 per cent of the Development Areas than to the average for Great Britain of 8 per cent. In Grimsby-Cleethorpes there was no new industrial development during the 1930s, and with the downturn in the holiday industry almost all employment remained more or less dependent upon the fishing trade. The new port of Immingham was little used. The only real change on the south bank was the continued growth of the steel industry at Scunthorpe, drawing in new labour from the coalmining areas to the west.

10.4. The very heavy damage during the 1939-45 war, especially in Hull, left the Area with low levels of population and employment, but after the immediate post-war years there was a steady recovery on North Humberside and major new developments on the south bank.

10.5. The number of employees* in the Area rose between 1953 and 1967 from 260,000 to 307,500, an increase of 18·3 per cent. The increase on North Humberside was 14·9 per cent and on South Humberside 24 per cent. These are high rates, but they should be seen against the background of a rise in employment in Great Britain of 11·5 per cent during the same period. (See Figures 5a and b.)

10.6. To help assess the significance of changes on Humberside, a picture of employment in the Area in the form of ratios to national employment is given in Table 10a. The years 1953-66 were a period of slow but steady growth in the Area's total share of national employment, which rose from 12½ per thousand at the beginning to 13½ per thousand at the end—with South Humberside showing an appreciably better growth rate than North Humberside. The figures for 1967 show a drop back to the 1963-64 levels.

10.7. The industries in which the Area's share of national employment grew most rapidly were chemicals, metal manufacture, shipbuilding, 'vehicles'—mainly car components and aircraft (on the north bank)—timber and furniture (on the north bank), and textiles (south bank). As employment in agriculture, forestry and fishing declined much faster elsewhere than in the Area, Humberside's share of the national total in this group also increased.

10.8. The largest absolute increase over the whole period was in the service industries. But such increases were general throughout the country, so that Humberside's share of service employment in Great Britain hardly increased at all up to 1966 and fell markedly in 1967.

10.9. The number of female employees in the Area increased from 71,400 in 1953 to 100,100 in 1967: a 40 per cent increase as against 10 per cent in male employment. In terms of percentage shares of national employment for each sex, total male employment grew only slightly in that period (it actually fell on North Humberside), while female employment grew markedly. As in the rest of Great Britain, most women employees on Humberside are in the service trades (87 per cent).

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* Statistics of employees in the Area and calculation of changes in employment are based on the June count of National Insurance cards, covering both those in employment and the wholly unemployed. This material has certain deficiencies, especially when used for small areas like a subdivision of a region. The details for Humberside are given in the tables at the end of this chapter. The shortcomings of the statistics and the methods of analysis used are described in Annex 10A.

Figure 5a Humberside employees per 10,000 Great Britain employees

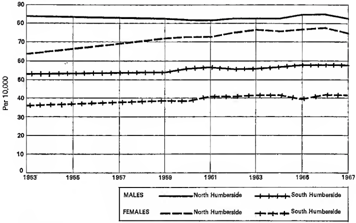

Figure 5b

Humberside employees (thousands)

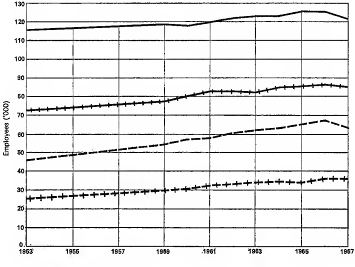

TABLE 10a

Humberside employment relative to Great Britain* 1953–67

	Industry	1953	1959	1960	1961	1962	1963	1964	1965	1966	1967	% change 1953-67
North Humberside: Males	Primary	84	65	68	69	74	70	70	71	69	74	16
	Manufacturing	77	76	77	77	79	79	79	81	81	79	3
	Construction	71	85	77	78	78	77	77	76	77	75	7
	Services	114	108	105	106	105	106	108	107	108	105	–8
	Total	84	83	82	82	83	83	83	85	85	83	–1
Females	Primary	81	59	80	70	71	69	63	56	57	49	–40
	Manufacturing	84	67	71	69	76	72	74	73	73	71	11
	Construction	72	68	65	60	70	70	69	84	85	88	–8
	Services	72	82	84	85	88	90	88	90	92	88	22
	Total	64	72	73	73	75	77	76	77	78	75	17
South Humberside: Males	Primary	89	69	75	72	74	82	83	81	87	89	29
	Manufacturing	56	82	62	65	63	65	65	65	64	85	16
	Construction	108	91	104	104	112	90	103	115	116	115	9
	Services	84	82	82	80	80	76	80	78	81	79	–6
	Total	53	54	56	57	56	56	57	58	58	58	9
Females	Primary	98	93	103	105	97	87	107	112	114	109	11
	Manufacturing	27	34	34	37	38	41	41	36	40	41	52
	Construction	80	56	53	48	89	65	65	81	75	82	3
	Services	73	74	75	76	75	73	73	72	74	73	1
	Total	36	39	39	41	41	42	42	40	42	42	17
Humberside	Primary	136	135	143	144	149	153	155	153	158	163	20
	Manufacturing	119	126	128	131	131	134	135	134	134	134	13
	Construction	84	88	86	85	89	81	85	90	92	90	7
	Services	89	90	89	89	89	90	89	90	91	88	–1
	Total	124	128	129	130	131	132	133	133	135	132	6

* The ratio for Primary, Manufacturing and Total is male/female employees on North/South Humberside per 10 000 male/female employees in Great Britain.
The ratio for Construction and Services is male/female employees per head of population on North/South Humberside expressed as a percentage of male/female employees per head of population in Great Britain.
Source: Based on material supplied by the Department of Employment and Productivity.

TABLE 10b

Percentage of unemployment*

	North Humberside			South Humberside			Great Britain		
Year	Males	Females	Total	Males	Females	Total	Males	Females	Total
1955	1·9	1·5	1·8	1·0	1·9	1·1	1·1	1·1	1·1
1956	1·9	1·2	1·7	1·0	1·9	1·2	1·2	1·2	1·2
1957	2·5	1·5	2·2	1·8	2·3	1·8	1·5	1·3	1·4
1958	3·8	2·3	3·3	1·8	2·3	1·8	2·3	1·8	2·1
1959	4·1	2·0	3·4	2·2	2·5	2·3	2·4	1·7	2·2
1960	2·7	1·4	2·3	1·5	1·8	1·6	1·8	1·3	1·6
1961	1·9	1·1	1·6	1·9	1·9	1·3	1·7	1·1	1·5
1962	2·8	1·3	2·2	2·3	1·8	2·1	2·3	1·4	2·0
1963	3·4	1·8	2·9	3·2	2·9	2·9	3·0	1·6	2·5
1964	2·5	1·2	2·1	1·9	2·1	2·0	1·9	1·1	1·5
1985	2·2	1·0	1·8	1·8	1·7	1·8	1·7	0·9	1·4
1966	2·3	0·9	1·8	2·1	1·5	1·9	1·9	0·9	1·5
1967	4·0	1·2	2·9	2·9	1·9	2·6	3·0	1·3	2·4
1968	4·9	1·2	3·6	3·3	1·7	2·8	3·2	1·0	2·4

* Includes wholly unemployed, temporarily stopped and school leavers

Source Department of Employment and Productivity.

Unemployment

10.10. Movements in the unemployment rates on North and South Humberside in comparison with Great Britain are shown in Table 10b and Figure 6. Unemployment on North Humberside has been higher than the national rate throughout the two cycles included in the series, owing to the persistently high level of male unemployment. There was some improvement during the period up to 1966, but this was offset by the great increase in male unemployment in 1967 and 1988. On the south bank the unemployment rate, which had been similar to the Great Britain rate until 1862, rose slightly, becoming similar to the North Humberside rate. This deterioration reflects an increase in male unemployment up to the Great Britain level, with female unemployment persistently higher than the Great Britain rate. The main features of the period are the higher-than-Great Britain levels of unemployment for males on the north bank and females on the south bank and, in particular, the great fluctuations in male unemployment on the north bank. On both banks the seasonal nature of work in the holiday industry, agriculture and fishing, and fluctuations in casual employment in the ports, contributed to the high unemployment rates.

Activity ratas*

10.11. Activity rates for small areas cannot be very accurately measured, and the figure calculated for Humberside—55 per cent in 1986—is probably under-estimated compared with the national calculation. Even so, the true activity rate in the Area has almost certainly been somewhat lower than the average figure for Great Britain of nearly 58 per cent. The difference was wholly in the female activity rate, which was 35 per cent as against 40 per cent nationally. The female activity rate on South Humberside was particularly low at 32 per cent, due partly to lack of jobs for women in Scunthorpe. The activity rate for Humberside as a whole has been increasing in recent years, being 49 per cent in 1951 and 53 per cent in 1981, though in 1967 it fell again to 53 per cent. (See Table 10A.1 for details.)

Earnings and skills

10.12. Comprehensive data on earnings in the Area are not available, but Table 10c shows the earnings of individuals in Hull, Parts of Lindsey and in Yorkshire and Humberside relative to the national average. The difference between earnings of skilled workers on Humberside and elsewhere is small, so that the main factors depressing average earnings are likely to be the comparatively high proportion of unskilled workers and the low female activity rates on the south bank.

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* The percentage of the population over 15 who are at work or registered as unemployed.

TABLE 10c

Annual average earnings of individuals—Hull, Parts of Lindsey, and Yorkshire and Humberside relative to Great Britain

	Males			Females		
	1964-5	1965-6	1988-7	1984-5	1985-6	1966-7
Hull CB	89·0	91·6	89·2	91·6	87·4	91·0
Parts of Lindsey	98·2	97·5	98·2	90·1	92·3	89·8
Yorkshire and Humberside	93·9	94·5	93·7	91·2	93·2	93·0
Great Britain	100	100	100	100	100	100
Great Britain actual £	995·0	1,064·0	1,120·0	514·0	547·0	576·0

Notes: *i* Classification to region and postal sub-region (as opposed to gazetteer sub-division) is by place of residence. Armed forces are excluded.

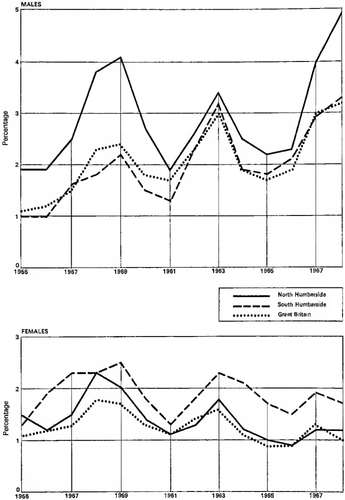
ii The averages cover persons who (a) have paid 48 or more National Insurance contributions or (b) have been credited with 48 or more contributions and actually paid at least one during the years in question.

iii The averages for Great Britain include some persons whose address was not known and who are therefore excluded from regional averages.

iv South Humberside has approximately two-thirds of the population of Parts of Lindsey.

Source: Department of Health and Social Security (special tabulation).

Figure 6 Percentage unemployed



Footnotes: 1. The unemployed are total registered unemployed and are annual averages.
2. The 1966 figure includes an estimated December figure.

Migration

10.13. Over the period 1951-66 net migration resulted in a steady loss of population from North Humberside and a small gain in South Humberside. the total net outward migration for Humberside as a whole in these 15 years was 12,000. The peak period for both banks was the five years 1956-61. The main reason for the net outward migration from North Humberside was presumably the shortage of jobs, particularly well-paid, highly skilled ones. Inward migration into South Humberside was fastest during the major build-up of the steel industry. Chapter 2, Table 2d, gives details.

Distribution of industry policy

10.14. The slow but steady rise in the Area's share of national employment in the manufacturing industries has not been due to any exceptional help given under the Government's distribution of industry policy. Though Humberside has never been considered to be 'over-heated' or 'congested' and applications for industrial development certificates (idc's) have not been treated as strictly as those relating to new industrial developments in the South East or West Midlands, the Area is not eligible for financial incentives. No part of Humberside has ever been scheduled as a Development District or as a Development Area (although for a brief period in 1959 schemes in the Hull district were eligible for assistance under the Distribution of Industry (Industrial Finance) Act of 1858). Some firms from outside the Area have received idc's for Humberside when there were good reasons why they should settle in the Area rather than in Development Areas. Firms moving into Humberside have included: those wishing to employ the surplus female labour at Scunthorpe and Goole; food-processing firms coming to Grimsby and Hull to be near their sources of supply; and oil refineries and chemical manufacturers with special estuary-site requirements. Other new entrants have had less specific reasons; a few have overseas associations for which this North Sea port location is useful. Applications for idc's for extensions by firms resident on Humberside have been freely approved. Over most of the period the broad influence of the Government's distribution of industry policy can be considered as neutral, but the recent intensification of assistance to the Development Areas is likely to have adverse effects in the Area (see para. 10.46).

10.15. The local expansion of the engineering and electrical industries might well have been faster had not new 'footloose' developments in these industries been drawn towards the Development Areas. However, if there had been no control over the location of industry, there is no reason to suppose that Humberside would have benefited from the quite different conditions which would have then prevailed.

Raw material sources and sale destinations

10.16. The relative importance of the sources supplying materials to manufacturing industry on Humberside is shown in Table 10d and the distribution of sales in Table 10e.

10.17. Although it is dependent to a substantial extent on materials supplied from local sources or imported through local ports, Humberside's manufacturing industry does not depend very much on local sales or exports via the Humber: nearly 80 per cent of total sales by firms surveyed were to markets outside Humberside and the West Riding and were transported other than via the Humber ports. Local markets were of significant size only in the case of shipbuilding and ship-repairing, chemicals, food-processing and cement.

TABLE 10d

Raw materials and their sources (by value)

Industry SIC orders	Materials, %	Source of materials			
		Materials from each source, as % of total materials used by each industry			
		Local Humber	Imports via Humber	West Riding	All other
All manufacturing industries	100·0	11	45	12	32
INDUSTRIES					
Chemicals, etc.	39·4	2	77	2	19
Metal manufacture	25·7	13	12	35	40
Food, drink, etc.	14·4	42	29	3	26
Timber, etc.	3·9	4	87	2	7
Textiles	3·7	5	37	3	55
Vehicles	2·8	2	1	8	91
Leather, etc.	2·3	4	17	10	69
Paper production, publishing, etc.	2·2	2	79	8	11
Metal goods	1·3	7	4	4	65
Engineering	1·2	13	10	26	51
Shipbuilding, etc.	1·1	22	11	8	59
Clothing	0·8	—	—	57	43
Cement, pottery, etc.	0·5	18	—	46	36
Other manufacturing	0·6	—	—	—	100

Source: Central Unit for Environmental Planning Industrial Survey of Humberside. See footnote on page 91.

TABLE 10e

Sales and their distribution (by value)

Industry SIC orders	Sales, %	% Distribution of sales			
		Local Humber	Exports via Humber	West Riding	All other
All manufacturing industries	100·0	8	5	8	78
INDUSTRIES					
Chemicals, etc.	24·2	7	7	4	82
Metal manufacture	27·6	1	8	13	77
Food, drink, etc.	19·4	10	2	7	81
Timber, etc.	3·5	14	4	18	64
Textiles	6·7	3	—	9	88
Vehicles	1·4	3	7	3	87
Leather, etc.	2·0	4	6	8	84
Paper production, publishing, etc.	2·8	14	—	6	80
Metal goods	2·0	10	1	4	85
Engineering	4·3	3	14	6	77
Shipbuilding, etc.	2·2	50	8	7	35
Clothing	1·0	1	1	7	81
Cement, pottery, etc.	2·2	83	—	26	11
Other manufacturing	1·0	—	—	21	78

Source: Central Unit for Environmental Planning Industrial Survey of Humberside.

Present industrial patterns*

General

10.18. The number of employees in the Area in 1967 was 307,500, equivalent to 13½ out of every 1,000 employees in Great Britain. Table 10f and Figure 7 show how these employees were distributed between the main groups of industries on each bank and compares this with Great Britain. It will be seen from this Table that though the distribution by broad categories (e.g. total manufacturing) is the same on Humberside, taken as a whole, as in Great Britain, there are appreciable differences when each bank, or particular industries, are considered separately.

10.18. The percentage of employees in the service trades is well above the Great Britain average on North Humberside, mainly due to the large transport and distribution groups catering for Hull's port activities, and is below average on South Humberside for all service trades except transport. Since service employment is likely to be under-recorded in the Humberside figures (Annex 10A.7), this probably means that while North Humberside is very substantially above the national average, South Humberside is in fact only slightly below.

10.20. There are considerable differences between the Area and Great Britain in the distribution of employees between particular industries, the most notable are the relatively high proportions in fishing, agriculture (south bank), food-processing (particularly on the south bank), chemicals, metal manufacture, timber (north bank) and shipbuilding. The proportions most below those for Great Britain are in mining (there is no coalmining in the Area), the engineering and electrical industries and textiles. Details of the industries on each bank are set out more fully in paragraphs 10.21-10.37.

North Humberside

10.21. The number of employees on North Humberside grew from 161,700 in 1953 to 185,600 in 1987, an increase of nearly 15 per cent. In terms of proportion of total employment in Great Britain, North Humberside's share of male employment fluctuated narrowly around 8·4 per thousand, but its share of female employment rose from about 8·4 to 7·5 per thousand

10.22. No single manufacturing industry employs a large proportion of the total labour force, but of the 67,700 employees in manufacturing in 1967 over three-fifths were in four industrial groups: chemicals: engineering, electrical and metal goods; food; and vehicles. The chemical and allied industries, with 18·2 per cent of the manufacturing labour force located chiefly in Hull and district, make a variety of products including industrial chemicals, paints, dyes, oils and soaps. Most of these sections expanded from 1953 to 1967, in contrast with the small national decline in employment in this group of industries. The relatively small engineering, electrical and metal goods industries produce a variety of products, including excavators, grabs and plant machinery, and lighter goods, including tin boxes, canisters and typewriters.

10.23. The number of employees in the important food-processing industries, which are mainly situated in the Hull area, has declined since 1953. Increases in employment by firms manufacturing and processing meat and fish products were offset by decreases in establishments producing bread and flour, confectionery, sugar confectionery and animal and poultry foods. In general, food production on the north bank contains a high proportion of the older sectors of the industry.

10.24. Employment in aircraft production is provided at the former Blackburn aircraft factory at Brough (now part of the Hawker Siddeley group). The factory has been primarily devoted to production for the armed services and the numbers employed, although expanding rapidly up to 1863, have recently fallen with changes in the military aircraft programme. Total employment in vehicles and aircraft has grown more rapidly than in any other manufacturing industry in recent years: this sector includes the manufacture of car parts and accessories, which is important in Beverley, and caravan building in Hull.

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* Valuable qualitative data on various industries in the Area, statistics on sources of raw materials and distribution of sales, appreciation of the main factors affecting growth in the Area and estimates of future labour needs were obtained by an industrial survey of local manufacturing industry carried out for the Unit by the staff of the Board of Trade and of the Department of Employment and Productivity. The detailed results can be obtained on enquiry from the Department of Economic Affairs.

Figure 7 Distribution of Humberside and Great Britain employment in 1967

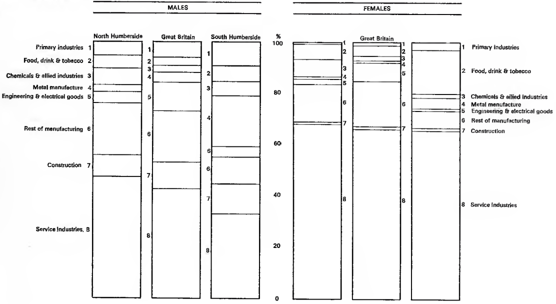

TABLE 10f

*Humberside employees 1967: distributed by main industrial groups

		'000			%			
		North Humberside	South Humberside	Total Humberside	North Humberside	South Humberside	Total Humberside	Great Britain
	Industries †							
Primary								
1.	Agriculture, forestry, fishing	7·1	8·0	15·1	3·8	6·6	4·9	1·9
2.	Mining and quarrying	0·2	1·1	1·3	0·1	0·9	0·4	2·4
	Total Primary (1, 2)	7·2	8·1	16·4	3·9	7·5	5·3	4·3
Manufacturing								
3.	Food, drink and tobacco	9·5	11·4	20·9	5·1	9·4	6·8	3·6
4.	Chemicals and allied industries	12·3	5·5	17·8	6·6	4·5	5·8	2·2
5.	Metal manufacture	4·2	18·7	22·9	2·3	15·4	7·4	2·6
6.	Engineering and electrical	6·8	3·9	10·8	3·7	3·2	3·5	10·1
7.	Shipbuilding	5·1	2·6	7·7	2·7	2·1	2·5	0·9
8.	Vehicles	9·1	0·3	9·5	4·9	0·2	3·1	3·6
9.	Metal goods not elsewhere specified	4·3	0·2	4·5	2·3	0·2	1·5	2·5
10.	Textiles	0·7	2·4	3·1	0·4	2·0	1·0	3·1
11.	Bricks, pottery, glass, cement, etc.	2·5	1·6	4·2	1·3	1·3	1·4	1·5
12.	Timber, furniture, etc.	5·5	1·1	6·5	3·0	0·9	2·1	1·3
13.	Paper, printing, publishing	3·3	1·7	5·0	1·8	1·4	1·8	2·7
14.	Other manufacturing industries	4·3	1·5	5·8	2·3	1·2	1·9	3·9
	Total Manufacturing (3-14)	67·7	50·9	118·6	35·5	41·8	38·6	38·0
15.	Construction	10·6	10·6	21·2	5·7	8·7	6·9	7·0
Services								
16.	Gas, electricity and water	3·0	2·0	5·1	1·8	1·8	1·7	1·8
17.	Transport and communications	22·2	9·9	32·1	12·0	8·1	10·4	7·0
18.	Distributive trades	26·1	13·3	38·3	14·1	10·9	12·8	12·3
19.	Miscellaneous services	19·0	12·6	31·6	10·2	10·4	10·3	13·8
20.	Public administration, health and education	29·8	13·4	43·2	16·0	11·0	14·0	15·7
	Total Services (16-20)	100·1	51·1	151·2	53·9	42·0	49·2	50·6
	TOTAL	185·7	121·7	307·5	100·0	100·0	100·0	100·0

* Figures do not always add to totals due to roundings. In view of the inaccuracies in the basic data (see Annex 10A) this table only provides an approximate indication of numbers and distribution of employment in the Area.

† For description of the industrial groups see Table 10A.4.

Source: Based on material supplied by the Department of Employment and Productivity.

10.26. Another important feature on North Humberside is manufacture based, directly or indirectly, on imported timber. Since the Middle Ages Hull has been a main port of entry for timber from the Baltic countries and today is one of the few British ports capable of accommodating the largest bulk timber-carriers. The old established sawmilling industry and the advantages of easy access to raw materials have encouraged the production of building components and wood containers, which have found a ready market in local agriculture and the food-processing industry.

10.26. North Humberside has a wide range of smaller manufacturing industries, of which those with a large increase in employment in 1953-67 were metal goods, paper, printing and publishing; and the bricks, pottery, glass and cement group of industries, with the majority of its employees engaged in cement manufacture in the Hull-Hessle area. Shipbuilding and repairing, located in Hull, Goole, Hessle and Beverley, showed a substantial decline in employment between 1953 and 1963, followed by a small increase in 1963-67. The overall decline has been less than in other shipbuilding centres, due to specialisation in smaller vessels.

10.27. Port services and port-associated industries play an important part in North Humberside's economy: the ratio of employment in transport and communications to population is 40 per cent higher than the Great Britain ratio. Nevertheless, in post second world war years port activities have not provided any significant additional employment on Humberside. Hull used to be an important railway terminus handling many coal trains and other dock goods but, with rail rationalisation and the cessation of coal shipments, employment has declined markedly in this industry and large marshalling yards are no longer used.

10.26. The total of employees in the service trades on North Humberside has increased since 1953 at a faster rate than regionally or nationally. Within the total, particular services have grown or declined. Growth was particularly high in retail distribution, which accounted for one-third of the total increase in 1953-67. Part of the expansion was based on the revival of Hull's shopping and trading centre, as it was progressively rebuilt after the second world war. At the beginning of the period numbers in retail distribution were exceptionally low by national standards, but by 1966 they were somewhat higher in relation to the size of population served than in Britain as a whole. There has also been a substantial growth in the scientific and professional services group, in line with growth nationally. The ratio of employment to population in the public services on North Humberside has been well below normal, but is steadily growing.

10.29. Largely as a result of the railway and port changes, North Humberside's total of male employees in services, particularly transport and communications and wholesale distribution, has declined during the post-war years. Jobs for women, particularly in retail distribution, have however increased with exceptional rapidity.

South Humberside

10.30. Workers from other parts of the Area travel into both Grimsby-Immingham and Scunthorpe to work. Grimsby also attracts some workers resident in South Lindsey, and Scunthorpe's labour catchment area includes parts of Nottinghamshire. In 1967 the total labour force was approximately 121,700, of whom two-fifths were employed in manufacturing industries. Two-fifths were also in the service industries (excluding construction), as against one-half for the country as a whole.

10.31. Between 1953 and 1967 the number of employees in South Humberside increased by 24 per cent, more than double the national increase. Employment growth was fastest in the period up to 1961 and was due mainly to increases in four industries: metal manufacture at Scunthorpe; food-processing industries in Grimsby and district; the group of chemical and allied industries located close to the Humber estuary; and the service trades.

10.32. Metal manufacture provided 20 per cent of South Humberside's total male employment in 1967, mostly in Scunthorpe's three large integrated iron and steel plants, producing mainly bulk steelplate, sections and reinforcing rods, but with some specialist steels from Normanby Park. Between 1953 and 1961 the total of employees in metal manufacture rose 37·7 per cent. But after 1961 this trend was not maintained and, although there was a modest increase after the 1963 recession, the industry's labour force has fallen substantially since 1965, in terms both of numbers and share of national employment in metal manufacture. Scunthorpe has not attracted much engineering or other metal-using industry and thus remains effectively a one-industry town, with limited opportunities for women to find work.

10.33. The second major source of employment growth in manufacturing has been the food industry in and around Grimsby. Recent expansion has been associated with changes in the industry's organisation—larger, often international, firms displacing or buying out smaller ones. For example, Birds Eye Food Limited bought out Smethursts at Grimsby after the war and expanded rapidly to become the biggest single buyer of Humber-landed fish and North Lincolnshire's agricultural produce. The town of Grimsby is now not so much a fishing port—although that is still important—as a major centre for the freezing, processing and packing of fish, vegetables and other foods. The number of employees in food-processing rose substantially in the period 1953-63, and the increase in its share of the national total in the industry was substantial too. After a sharp drop in 1964-65, the industry's labour force has again increased, but it has not yet recovered the share of national employment it had in 1963-64.

10.34. The third major element in South Humberside's industrial growth has been the development of raw material-processing industry, principally heavy chemicals, on sites along the Humber bank immediately upstream from Grimsby. This stretch of land offered outstanding locational advantages to incoming firms, particularly those using imported bulk materials, since it was flat, cheap and close to deep water. Beginning in the late 1940s, several large new factories have been established between Immingham and Grimsby by such firms as British Titan Products, producing titanium oxide (1946); Fisons, fertilisers (1951); CIBA Laboratories, pharmaceutical preparations (1951); Laporte, titanium oxide (1952); Courtaulds, synthetic fibres (1957); and ICI (1966). One oil refinery is now complete and another will begin refining early in 1969. Coke ovens operated by the Scunthorpe steel manufacturers constitute a smaller section of the chemical and allied group of industries. Altogether, the group provided 10·6 per cent of South Humberside's manufacturing employment in 1967. The major part of its growth occurred in the period up to 1961-62: since then employment has tended to level off.

10.35. In 1967 the three groups considered above accounted for 70 per cent of South Humberside's employment in manufacturing. The remaining manufacturing industries are comparatively small. In Grimsby these include textiles (manufacturers of synthetic fibres, rope, twine and nets); shipbuilding and repairing (mainly fishing vessels); and paper manufacture. Scunthorpe has some light industry, including knitwear manufacture employing a high proportion of female labour. Most of these industries expanded in the years 1959-67, but the resultant total increase was small. One exception to the general pattern of expansion was the contraction of bicycle manufacture at Barton-upon-Humber.

10.36. Agriculture and fishing, though providing a shrinking number of jobs, are still amongst South Humberside's largest and most important industries; in 1967 they accounted for 6·6 per cent of its total employees, over three times the corresponding national figure. The agricultural labour force consists largely of men, but is supplemented by women for seasonal work. Progress in applying mechanised techniques to the handling of a wide range of crops has had a significant impact on South Humberside, and capital investment, farm yields and profitability are high. The fishing industry, apart from being itself an important local source of employment, also supports a range of ancillary activities, including ice production, box-making, marine engineering and the production of fishmeal and cod liver oil. Employment at sea has tended to decline with increased efficiency and the use of larger boats.

10.37. A large part of the increase in employment on South Humberside occurred in construction and throughout the service industries. The rate of growth in the construction industry was particularly high in 1964 and 1965 and, more recently, building work on two new oil refineries—Continental and Lindsey—has contributed to maintaining a high level of employment. Scunthorpe has a low proportion of employment in the service trades, whereas in the Grimsby-Immingham area it is high because of port activities and the large-scale development of storage and distribution facilities for oil, petroleum products and other liquid imports.

Future employment prospects

Statistical projections

10.39. Humberside's share of national employment has expanded steadily, if slowly, in the past 13 years, although at different rates in various industries. We have projected these trends to 1971 and 1991: the results are summarised in Table 10g. (Detailed results are given in Table 10A.17, and the methods used are described fully in that Annex.)

10.39. For comparison with this trend in demand for labour the likely number of employees who will be seeking work in the Area has been estimated. (Annex 10A, A.2-A.3, describes the methods.) Because of the recent high rate of natural increase in the population of the Area, these estimates show a substantial growth in the number of potential employees in the period to 1991, whereas the number of employees in Great Britain as a whole is expected to grow much more slowly. These estimates assume that there will be no further net migration either into or out of the Area.

10.40 The projected demand for employees in the Area is compared with the probable supply in Table 10h. On the basis of these purely statistical projections the total demand for labour in the Area by 1981 would slightly exceed the supply; but, within the totals, there would be a substantial shortage of jobs for men on North Humberside and a large excess demand for women workers. On South Humberside, on the other hand, the position would be broadly one of balance for each sex. Up to 1971 it would be very similar in all cases, but with much smaller differences between supply and demand.

Reliability of statistical projections

10.41. A careful assessment is needed of how far these statistical projections of employment are a guide to what may really happen, for few projections of this nature as far ahead as 1991 are likely to prove accurate. The national estimates on which they are based are uncertain because the movement of workers from one type of industry to another, owing to technological and other changes, is hard to predict. Moreover, the basic assumption made when calculating our projections is that the average growth in Humberside's share of national employment over the years 1953-67 in each category of employment will continue at the same rate in the future. Projecting a somewhat uncertain trend a long way into the future cannot give firm results. The trend could change markedly, and even small changes could produce a substantial difference in the gap between supply and demand.

10.42. There have indeed been signs recently that the trend may be changing—to the disadvantage of the Area—because Humberside's share of national employment has tended to level off in several important categories in the past few years. Although this has only had a small effect on the average growth rate over the whole 1953-67 period—and hence on the projections—it may indicate that these projections are, if anything, on the high side. In 1967 there was a marked drop in employment, especially on North Humberside, and unemployment in the Area increased from June 1966 to June 1969 by 169 per cent compared with just over 100 per cent nationally. A change in trend cannot, however, be firmly established by the figures for one year only, so that not much weight has been placed on this recent development.

10.43. The calculations of the supply of employees on Humberside are based on projections of activity rates. It is possible that the growth in activity rates for females on North Humberside could be faster than that projected, if the projected substantial excess of demand over supply for women workers arises. Another possibility is that such an excess, accompanied by a shortage of jobs for men, could lead to some men taking jobs which in our projections would apparently arise for women. The marked future rise in the number of employees on Humberside as compared with the very much slower rise in Britain as a whole may also mean that too great a downward adjustment has been made for the slow growth in national employment between now and 1991.

Manufacturing industries

10.44. Turning to manufacturing industry, firms covered by the industrial survey were asked to say how they thought their demands for labour would move in the next few years. Their replies showed that a wide range of factors would influence the labour needs of particular firms. Some foresaw the possibility of a rapid increase over the next few years and only a few saw a substantial decline. In general, the broad impression given by the replies indicated a somewhat higher overall demand for labour in the Area than that reached by the statistical projections.

10.45. The enquiries made during the survey brought out a valuable conspectus of industrialists' views about the advantages and disadvantages of the Area which might affect its economic growth. The major advantages of Humberside as a location were listed as the:

i facilities of the Humber ports;
ii convenience of the area for imported and locally purchased materials;
iii ample supply of land for expansion;
iv convenience for serving overseas markets—especially in Europe;
v use of the estuary to dispose of effluent.

Two other advantages which were listed cannot now be relied on as much as they were in the past: the greater availability of female labour; and the ample supplies of water.

10.46. Since the major disadvantage mentioned by four out of five firms covered in the survey was the Area's remoteness from other large urban areas, and poor road communications, the future of the Area's communications is of great importance. When the proposals for road improvements in the Ministry of Transport's road programme and preparation pools have all been carried out, the Area's roads to the rest of the country will be dramatically improved (see para. 9.132). It will be possible to reach the country's main motorway system from Hull and Scunthorpe over fast, mainly dual-carriageway roads. These developments will take some time to complete, but they should soon begin to make a substantial difference to the Area's economic growth rate, although its distance from the main centres of the country will remain an inhibiting factor. The growth in roll-on/roll-off and other shipping facilities may also stimulate the growth of local industry.

10.47. The future demand for Humberside's products will be affected by the general level of national and international demand, and by the relative success of Humberside's particular products. Our statistical calculations have allowed for the movement in national demand by broad categories of industry. Humberside's products may however not follow the general pattern, but statistically there is no way of adjusting for this. The Area is so small that even a major success or failure in a single firm could make a significant difference. Productivity may also alter in Humberside differently from the rest of the country, thus affecting the Area's employment, the profitability of Humberside firms and the general level of incomes.

TABLE 10g

*Trends in employment on Humberside

'000

Industries	*North Humberside*			*South Humberside*			*Total*			*Great Britain*		
	actual	*projected*		*actual*	*projected*		*actual*	*projected*		*actual*	*projected*	
	1967	1971	1981	1967	1971	1981	1967	1971	1981	1967	1971	1981
Primary												
1. Agriculture, forestry, fishing	7·1	5·6		8·0	6·4		15·1	12·0		443·6	343·2	
2. Mining and quarrying	0·2	0·2		1·1	0·9		1·3	1·1		559·5	415·9	
Sub-total (1, 2)	7·2	5·8	3·9	9·1	7·3	5·4	16·4	13·1	9·3	1.003·1	759·1	490
Manufacturing												
3. Food, drink, tobacco	9·5	9·4		11·4	12·6		20·9	22·0		839·4	841·3	
4. Chemicals and allied industries	12·3	12·4		5·5	6·4		17·8	18·8		523·0	518·3	
5. Metal manufacture	4·2	4·4		18·7	21·4		22·9	25·8		603·0	604·4	
6. Engineering and electrical goods	6·9	7·1		3·9	2·6		10·8	9·7		2.351·7	2.313·5	
7. Shipbuilding and marine engineering	5·1	4·3		2·6	2·2		7·7	6·5		205·7	177·1	
8. Vehicles, aircraft	9·1	11·0		0·3	0·3		9·5	11·3		825·9	819·1	
9. Metal goods not elsewhere specified	4·3	4·3		0·2	0·2		4·5	4·5		578·4	597·1	
10. Textiles	0·7	0·4		2·4	2·7		3·1	3·1		715·2	666·8	
11. Bricks, pottery, glass, cement, etc.	2·5	2·6		1·6	1·6		4·2	4·2		355·0	333·9	
12. Timber, furniture, etc.	5·5	6·0		1·1	1·0		8·5	7·0		307·4	297·1	
13. Paper, printing, publishing	3·3	3·6		1·7	1·6		5·0	5·2		639·4	622·8	
14. Other manufacturing industries	4·3	4·5		1·5	1·9		5·8	6·4		901·4	856·1	
Sub-total (3-14)	67·7	70·0	70·0	50·9	54·5	57·2	118·8	124·5	127·2	8.845·5	8.647·5	8.330
15. Construction	10·6	11·0	13·9	10·6	10·3	13·8	21·2	21·3	27·7	1.630·7	1.598·7	1.960
Services												
16. Gas, electricity, water	3·0	3·1		2·0	2·2		5·1	5·3		428·2	425·7	
17. Transport and communications	22·2	20·6		9·9	8·6		32·1	29·2		1.633·8	1.549·5	
18. Distributive trades	26·1	27·1		13·3	13·4		39·3	40·5		2.850·8	2.800·2	
19. Miscellaneous services	19·0	21·6		12·6	13·2		31·6	34·8		3.220·4	3.405·5	
20. Public administration, health, education	29·8	37·8		13·4	18·4		43·2	54·2		3.642·6	4.155·1	
Sub-total (16-20)	100·1	110·2	128·4	51·1	53·8	58·0	151·2	164·0	188·4	11.775·9	12,336·0	13.720
TOTAL	185·7	197·0	216·2	121·7	125·9	134·4	307·5	322·9	350·6	23.255·7	23.341·3	24.500

* Figures do not always add to totals due to rounding.
(Details of the projected employment and methods of calculation are given in Annex 10 A.)
Source: Based on material supplied by the Department of Employment and Productivity.

TABLE 10h

*Projection of supply and demand for labour on Humberside

'000

	North Humberside			South Humberside			Total
	Males	Females	Total	Males	Females	Total	Humberside
1971							
Supply	130	70	200	87	38	125	325
Demand	123	74	187	88	40	126	323
1981							
Supply	136	77	213	80	45	135	348
Demand	125	92	216	89	45	134	351

* Figures do not always add to totals due to rounding.

10.48. Government policy on the distribution of industry may also have new effects on the Area which the projections could not allow for. Distribution of industry policy in the past has had little effect on the Area (see paragraphs 10.14 and 10.15), but in the last two years the special inducements offered to industry to set up or expand in Development Areas have been intensified and, including differential investment grants, the regional employment premium and assistance under the Local Employment Acts, are now worth over £250 million a year. These increases are likely to have some inhibiting effects on the development of industry on Humberside—effects which are not yet reflected fully in the statistics or our employment projections. The Hunt Committee is considering the problems of areas outside Development Areas whose rate of economic growth gives cause for concern, and it may produce proposals leading to further changes in the Government's policy in this field, the effects of which on Humberside cannot be predicted. Assuming, however, that present policies remain unchanged—which is the simplest basis for our analysis—on this score expansion can be expected to be below the statistical projection of past trends.

10.49. As far as particular industries are concerned the employment group of *metal manufacture* has shown, on average, a substantial growth rate from 1953 to 1967, and this has been incorporated in the projections. However, employment in this sector is largely provided by the three major steel works at Scunthorpe, and the main growth has been the build-up of employment in those works during the early 1960s. The long-term plans of the British Steel Corporation for these now nationalised plants were not available at the time of writing, but employment has already dropped from the peak of 1965 and a further downward movement seems probable, despite substantial increases in production. To take account of this the high employment level projected should be reduced by 2,000 or 3,000 employees in 1971, with further reductions in the 1981 totals. This could have a substantial effect on the overall level of male employment on South Humberside.

10.50. Employment in the *chemical and allied industries* in the Area has also grown substantially in recent years, especially on South Humberside, due to the major developments on the south bank. Further progress may, however, be particularly affected in this type of industry, in which investment is large and capital intensive, by the inducements offered to industry to go to the Development Areas or expand in them. The higher rate of investment grant for Development Areas introduced in 1968 may well have made it financially attractive to capital-intensive industry to locate in Development Areas, even when other cost factors, such as transport, are lower on Humberside. On that basis the projected increase of employment in this sector of 1,400 employees by 1971 would not be achieved. Prospects in the long term might be affected by new major developments, such as the reclamation of Spurn Bight to utilise the very deep water in Hawke Roads (see para. 4.10), but this would be a long-term project with effects hardly apparent in the 1970s.

10.51. In the *vehicles and aircraft* sector the prospects of the aircraft industry are particularly uncertain at present, so that it is a matter of speculation whether the projected increase in this whole group of 2,000 workers by 1971 will be achieved. The workers in these industries do, however, constitute an important pool of skilled labour which should be fully used in one way or another. In *engineering and electrical goods* a small decline is projected by the statistics, especially on South Humberside, but contrary to the general trend there was some expansion in this sector from 1966 to 1967, so that in this case the decline may not take place. *Shipbuilding*, in view of the generally brighter future now forecast for that industry, may not have a further decline in employment of the size projected.

10.52. The growth in the important *food-processing* industry in the Area may also be greater than that shown in the projections. Employment in the *other manufacturing* industries is relatively small. Most of the statistical projections for them indicate little change and there is no particular reason to consider that the total of these projections will be widely inaccurate, although individual sectors could vary.

Service industries

10.53. Since *service* industries largely meet local needs, the projections have been based on the ratio of employment per head of population in Humberside to the corresponding Great Britain figures. These ratios in general have been increasing rapidly so that, projected forward, and applied to a population which is itself growing faster than that in the country as a whole, the Area's share of national employment in these trades would be increased substantially. Since national employment is also growing, the final figure is an increase of 37,000 in the estimate for 1981 over 1967—a 24 per cent increase.

10.54. The Area's present ratio of employment to population is well below that of the national average in many service trades, so that some increase in employment can be expected. However, a large part of the local increase in recent years has been in female employment in the distributive trades, particularly in Hull, and it seems unlikely that rapid growth will continue in this sector, especially if a shortage of female workers develops on North Humberside as our projections indicate might happen.

10.55. Port employment is an important element in the services category, and this has been declining in recent years as shown by the figures for transport and communications. Continued progress with the use of containers and roll-on/roll-off techniques at the Humber ports, together with the transfer of documentation, customs clearance, etc., to inland container depots, is likely to cause a further fall in the numbers required locally to work in port transport, communications and wholesale distribution per unit of traffic handled: savings of as much as 45-50 per cent of dock-worker hours per unit handled are possible by 1981. Against this, however, there is likely to be an unprecedented increase in the total volume of traffic handled by the Humber ports, possibly as much as a two-and-a-half-fold increase from 1966 to 1981, due to the modernisation of and extensions at the ports and the rapid growth in trade with Europe. Table 10i gives some details; these two factors will work in opposite directions so that there is unlikely to be a substantial increase in employment in this category.

TABLE 10g

*Trends in employment on Humberside

'000

Industries	North Humberside *actual* 1967	North Humberside *projected* 1971	North Humberside *projected* 1981	South Humberside *actual* 1967	South Humberside *projected* 1971	South Humberside *projected* 1981	Total *actual* 1967	Total *projected* 1971	Total *projected* 1981	Great Britain *actual* 1967	Great Britain *projected* 1971	Great Britain *projected* 1981
Primary												
1. Agriculture, forestry, fishing	7·1	5·6		8·0	8·4		15·1	12·0		443·5	343·2	
2. Mining end quarrying	0·2	0·2		1·1	0·9		1·3	1·1		559·5	415·9	
Sub-total (1, 2)	7·2	5·8	3·9	9·1	7·3	5·4	15·4	13·1	9·3	1,003·1	759·1	490
Manufacturing												
3. Food, drink, tobacco	9·5	9·4		11·4	12·6		20·9	22·0		839·4	841·3	
4. Chemicals end allied industries	12·3	12·4		5·5	6·4		17·8	18·8		523·0	518·3	
5. Metal manufacture	4·2	4·4		18·7	21·4		22·9	25·8		603·0	504·4	
6. Engineering and electrical goods	5·9	7·1		3·9	2·5		10·8	9·7		2,351·7	2,313·5	
7. Shipbuilding and marine engineering	5·1	4·3		2·5	2·2		7·7	6·5		205·7	177·1	
8. Vehicles, aircraft	9·1	11·0		0·3	0·3		9·5	11·3		825·9	819·1	
9. Metal goods not elsewhere specified	4·3	4·3		0·2	0·2		4·5	4·5		578·4	597·1	
10. Textiles	0·7	0·4		2·4	2·7		3·1	3·1		715·2	666·8	
11. Bricks, pottery, glass, cement, etc.	2·5	2·8		1·5	1·6		4·2	4·2		355·0	333·9	
12. Timber, furniture, etc.	5·5	8·0		1·1	1·0		8·5	7·0		307·4	297·1	
13 Paper, printing, publishing	3·3	3·8		1·7	1·6		5·0	5·2		639·4	622·8	
14. Other manufacturing industries	4·3	4·5		1·5	1·9		5·8	6·4		901·4	856·1	
Sub-total (3-14)	57·7	70·0	70·0	50·9	54·5	57·2	118·6	124·5	127·2	8,845·5	8,547·5	8,330
15. Construction	10·5	11·0	13·9	10·6	10·3	13·8	21·2	21·3	27·7	1,830·7	1,598·7	1,960
Services												
18. Gas, electricity, water	3·0	3·1		2·0	2·2		5·1	5·3		428·2	425·7	
17. Transport and communications	22·2	20·6		9·9	8·5		32·1	29·2		1,633·8	1,549·5	
18. Distributive trades	28·1	27·1		13·3	13·4		39·3	40·5		2,850·8	2,800·2	
19. Miscellaneous services	19·0	21·5		12·5	13·2		31·5	34·8		3,220·4	3,405·5	
20. Public administration, health, education	29·8	37·8		13·4	18·4		43·2	54·2		3,642·6	4,155·1	
Sub-total (16-20)	100·1	110·2	128·4	51·1	53·8	58·0	151·2	154·0	188·4	11,775·9	12,338·0	13,720
TOTAL	185·7	197·0	216·2	121·7	125·9	134·4	307·5	322·9	350·6	23,255·7	23,341·3	24,500

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* Figures do not always add to totals due to rounding.
(Details of the projected employment and methods of calculation are given in Annex 10 A.)
Source Based on material supplied by the Department of Employment and Productivity.

TABLE 10h

*Projection of supply and demand for labour on Humberside

'000

	North Humberside			South Humberside			Total
	Males	Females	Total	Males	Females	Total	Humberside
1971							
Supply	130	70	200	67	39	125	325
Demand	123	74	197	95	40	129	323
1981							
Supply	136	77	213	90	45	135	349
Demand	125	92	216	89	45	134	351

* Figures do not always add to totals due to rounding.

10.48. Government policy on the distribution of industry may also have new effects on the Area which the projections could not allow for. Distribution of industry policy in the past has had little effect on the Area (see paragraphs 10.14 and 10.15), but in the last two years the special inducements offered to industry to set up or expand in Development Areas have been intensified and, including differential investment grants, the regional employment premium and assistance under the Local Employment Acts, are now worth over £250 million a year. These increases are likely to have some inhibiting effects on the development of industry on Humberside—effects which are not yet reflected fully in the statistics or our employment projections. The Hunt Committee is considering the problems of areas outside Development Areas whose rate of economic growth gives cause for concern, and it may produce proposals leading to further changes in the Government's policy in this field, the effects of which on Humberside cannot be predicted. Assuming, however, that present policies remain unchanged—which is the simplest basis for our analysis—on this score expansion can be expected to be below the statistical projection of past trends.

10.49. As far as particular industries are concerned the employment group of *metal manufacture* has shown, on average, a substantial growth rate from 1953 to 1967, and this has been incorporated in the projections. However, employment in this sector is largely provided by the three major steel works at Scunthorpe, and the main growth has been the build-up of employment in those works during the early 1960s. The long-term plans of the British Steel Corporation for these now nationalised plants were not available at the time of writing, but employment has already dropped from the peak of 1965 and a further downward movement seems probable, despite substantial increases in production. To take account of this the high employment level projected should be reduced by 2,000 or 3,000 employees in 1971, with further reductions in the 1981 totals. This could have a substantial effect on the overall level of male employment on South Humberside.

10.50. Employment in the *chemical and allied industries* in the Area has also grown substantially in recent years, especially on South Humberside, due to the major developments on the south bank. Further progress may, however, be particularly affected in this type of industry, in which investment is large and capital intensive, by the inducements offered to industry to go to the Development Areas or expand in them. The higher rate of investment grant for Development Areas introduced in 1966 may well have made it financially attractive to capital-intensive industry to locate in Development Areas, even when other cost factors, such as transport, are lower on Humberside. On that basis the projected increase of employment in this sector of 1,400 employees by 1971 would not be achieved. Prospects in the long term might be effected by new major developments, such as the reclamation of Spurn Bight to utilise the very deep water in Hawke Roads (see para. 4.10), but this would be a long-term project with effects hardly apparent in the 1970s.

10.51. In the *vehicles and aircraft* sector the prospects of the aircraft industry are particularly uncertain at present, so that it is a matter of speculation whether the projected increase in this whole group of 2,000 workers by 1971 will be achieved. The workers in these industries do, however, constitute an important pool of skilled labour which should be fully used in one way or another. In *engineering and electrical goods* a small decline is projected by the statistics, especially on South Humberside, but contrary to the general trend there was some expansion in this sector from 1956 to 1967, so that in this case the decline may not take place. *Shipbuilding*, in view of the generally brighter future now forecast for that industry, may not have a further decline in employment of the size projected.

10.52. The growth in the important *food-processing* industry in the Area may also be greater than that shown in the projections. Employment in the *other manufacturing* industries is relatively small. Most of the statistical projections for them indicate little change and there is no particular reason to consider that the total of these projections will be widely inaccurate, although individual sectors could vary.

Service industries

10.53. Since *service* industries largely meet local needs, the projections have been based on the ratio of employment per head of population in Humberside to the corresponding Great Britain figures. These ratios in general have been increasing rapidly so that, projected forward, and applied to a population which is itself growing faster than that in the country as a whole, the Area's share of national employment in these trades would be increased substantially. Since national employment is also growing, the final figure is an increase of 37,000 in the estimate for 1981 over 1967—a 24 per cent increase.

10.54. The Area's present ratio of employment to population is well below that of the national average in many service trades, so that some increase in employment can be expected. However, a large part of the local increase in recent years has been in female employment in the distributive trades, particularly in Hull, and it seems unlikely that rapid growth will continue in this sector, especially if a shortage of female workers develops on North Humberside as our projections indicate might happen.

10.55. Port employment is an important element in the services category, and this has been declining in recent years as shown by the figures for transport and communications. Continued progress with the use of containers and roll-on/roll-off techniques at the Humber ports, together with the transfer of documentation, customs clearance, etc., to inland container depots, is likely to cause a further fall in the numbers required locally to work in port transport, communications and wholesale distribution per unit of traffic handled: savings of as much as 45-50 per cent of dock-worker hours per unit handled are possible by 1981. Against this, however, there is likely to be an unprecedented increase in the total volume of traffic handled by the Humber ports, possibly as much as a two-and-a-half-fold increase from 1965 to 1981, due to the modernisation of and extensions at the ports and the rapid growth in trade with Europe. Table 10i gives some details: these two factors will work in opposite directions so that there is unlikely to be a substantial increase in employment in this category.

TABLE 10i

Foreign and coastwise traffic: Humber ports

'000 tons

	Actual				Forecast	
	1965		1966		1981	
Bulk cargoes	14,220		14,775		36,700	
Coal and coke		8,387		6,085		3,100
Petroleum		3,403		5,778		20,500
Other		2,430		2,932		13,000
General cargo	2,886		3,552		5,900	
Mixed cargo	1,789		1,854		3,400	
Fish	474		378		400	
TOTAL	18,519		20,439		45,000	
TOTAL, excluding coal and coke	10,132		14,374		42,900	
TOTAL, excluding coal and coke and petroleum	8,729		8,595		22,300	

Source. British Transport Docks Board.

10.56. The growth of total employment in services can also be assessed by comparing the ratio of those employed in the service industries to total employment in the Area with the national ratios. Past figures and the statistical projections are given in Table 10j. The ratio is projected to grow from 49 per cent in 1967 to 53 per cent in 1981 on Humberside, which is slightly lower than the national increase from 51 to 56 per cent. On North Humberside the projected ratio is 59 per cent in 1981. this seems a very high figure. Although the South Humberside ratio projected for that year may be rather low, the projection of service employment for the Area as a whole may be slightly on the high side.

Other industries

10.57. Employment in *agriculture and fishing* has been declining and despite prospects of increased output this process is likely to continue because of the steady rise in productivity. *Construction* is not expected to provide a great increase in the number of jobs up to 1971, owing to a reduction in construction activity for the chemical and allied industries (see para 10.50), but there should be more employment in this industry in the 1970s with the proposed major road programme and with increased house building. The statistical projection, with growth of nearly a third by 1981, would still put the ratio of construction to total employment below the 8 per cent national level by that year, so that this is not necessarily an over-estimate.

Conclusion

10.58. The expected major improvement in Humberside's road communications and the recent intensification of assistance to the Development Areas—factors which are both likely to have significant effects on growth—will affect employment in opposite ways and should tend to balance out. The prospects for particular industries seem to indicate that on balance our statistical projections of employment prospects may be on the high side, but it is probably easier to identify specific reasons for decline than to spot the growth points that could lead to substantial increases in the longer term. We therefore conclude that the totals in our statistical projections in Table 10g should be taken at present as a reasonable guide to the future, except that female employment on North Humberside and male employment on South Humberside may possibly be over-estimated—in the former case because the rapid growth in the past may not continue at the same pace, and in the latter case because of falling employment in the steel industry.

TABLE 10j

Service employment as a percentage of total employment

	North Humberside	South Humberside	Total Humberside	Great Britain
Actual				
1958	51	41	47	46
1959	53	42	49	48
1960	52	41	48	48
1961	52	41	48	48
1962	52	42	48	49
1963	54	41	49	50
1964	53	41	48	50
1965	54	42	49	50
1966	54	43	50	50
1967	54	42	49	51
Projected				
1971	56	43	51	53
1981	59	43	53	56

Source: Based on material supplied by the Department of Employment and Productivity.

10.59. The assumption made throughout is that the Government's distribution of industry policy in the country generally and towards Humberside in particular will remain broadly as it is today, and on this basis the growth in male employment on both sides of the estuary up to 1981, although substantial, may not be sufficient to match the exceptionally high natural growth of the Area's labour force. This gap might be reduced by men taking some of the projected excess of jobs for women, but some men are likely to seek work elsewhere, so that the present net outward migration from North Humberside may continue and the past inward migration trend for South Humberside may be reversed. The calculated size of the gap might indicate some increase in the rate of net outward migration, but this would be to put excessive reliance on the projections. But it certainly appears improbable that there would be a spontaneous growth in demand for labour in the Area which would support planned expansion of population in the period up to 1981.

10.60. In reaching this conclusion we have not placed much emphasis on the recent signs of a decline in the Area's rapid rate of employment growth. If, however, a change in trend is occurring, this could have serious consequences for the economic prospects of the Area and would reduce its value as a base for population growth. The employment figures for the next two or three years should therefore be examined closely to check this point. Other data becoming available in the next two or three years will also help to improve the precision of these forward estimates, including decisions on whether or not to proceed with major industrial development on the north bank east of Hull close to deep water and on the future of Scunthorpe's steel industry. The effects of the recently intensified measures of assistance to the Development Areas should also become clearer.

Annex 10A

Projections of future trends in employment

10A.1. This Annex describes how the projections of possible future supply and demand for labour on Humberside discussed in paras. 10.38-10.40 were obtained.

10A.2. The supply of labour for North and South Humberside has been calculated by applying specific employee activity rates to the home population aged 15 and over for males and females separately. Nil migration inwards or outwards from 1967 onwards was assumed. If previous migration trends were to continue there would, in fact, be some continued migration out of Humberside in this period, but it did not seem appropriate to incorporate this in the labour supply estimates because one of the main causes for the outflow of population must have been an inadequacy of employment opportunities within the Area. Theoretically, our independent estimates of labour supply and of labour demand should provide some guidance as to the likely future level of net migration but, because the difference between labour supply and demand is a small figure obtained by subtraction of two large ones, its use as a measure of the likely future level of migration would be very unreliable.

10A.3. Activity rates for 1971 and 1981 have been estimated by assessing how far past activity rates on Humberside will be likely to follow the trends in national activity rates. Table 1 summarises the position. Humberside activity rates are under-estimated compared with the national rates by about 2 per cent, due to omissions from local Department of Employment and Productivity Employment Record II forms (ERII), but no adjustment has been made for these in the figures since, otherwise, a corresponding adjustment would have to be made to the employee statistics. The activity rates in Table 1 are applied to the figures of home population of 15+ given in Table 2 to produce the numbers of employees in Table 3.

Employment data

10A.4. The Unit's analyses of labour demand made use of estimates of 'total employees' (whether in employment or unemployed) from the ERII records available for each employment exchange area in Humberside. Projections of labour demand might, of course, have been based on data relating to employees in employment rather than to total employees, but the statistics for this were not available down to the level of individual industries. Moreover, the use of data which include the unemployed reduces the year-to-year variation arising from cyclical conditions and so may be held to improve identification of the underlying trend. However a check, using a broad industrial classification, indicated that there would have been no major differences if our projections had been based on figures for employees in employment. When projections of the demand for labour in an area are based on trends in total employees some allowance has to be made for the assumed average level of unemployment, and the projections made in Chapter 10 have to be interpreted as inclusive of such an allowance. But the long term trend in demand for labour on Humberside may be slightly under-estimated by the use of ERII returns, owing to the downward trend in unemployment in the Area over the past few years.

10A.5. Another point is that demand for labour may exceed recorded figures of employment to the extent that employers are unable to recruit the numbers of workers they require. In an area like Humberside where there is not, and has not been, any significant shortage of labour, the difference between the true labour demand and the number of employees in employment is unlikely to be large and there would therefore be no case for making any significant addition to the projections of employment to allow for present unsatisfied demand in the Area.

10A.6. Figures for males and females separately, total employees for each industry (152 minimum list headings), sub-totals (24 orders of the standard industrial classification), people not classified by industry because they have been out of the employment field for 12 months or more (e.g. school-leavers and married women returning to seek employment, and grand totals) are all available from the ERII forms.

10A.7. The ERII statistics for employment exchange areas and sub-regions understate the figure of total employees because they exclude those civil servants who do not hold National Insurance cards and 'unlocated' employees, i.e. workers whose actual place of work is not identified but who are known to work elsewhere than in the employment exchange area in which their National Insurance cards are exchanged. A check has shown that the 1961 figure of total employees in Humberside was probably under-estimated by about 5 per cent in comparison with the Yorkshire and Humberside regional figure in which both civil servants and unlocated employees are included. Not all industries are equally affected by this problem—the largest under-estimates are likely to be in transport and communications, public administration, retail distribution and insurance, banking and finance. There are other shortcomings in local ERII returns which make it necessary to treat deductions from them for small areas and limited time scales with care.

10A.8. The four employment exchange areas on North Humberside of Hull, Hessle, Beverley and Goole were analysed separately from the three employment exchange areas on South Humberside of Grimsby, Barton and Scunthorpe. Males and females were also analysed separately. Many small individual industries in Humberside were grouped together for greater stability and reliability. The selection of the 20 category groupings shown in Table 4 was also influenced by the industry groupings used in the Cambridge social accounting matrix (SAM) to allow use of national forecasts by SAM categories.

10A.9. Employment data were collected for the years 1953 and 1959-67 inclusive. The 1953 data have been adjusted as far as possible to allow for the change in the standard industrial classification in 1958, but complete comparability with later figures could not be achieved. We hesitated whether to use these 1953 figures, but since significant changes appear to have taken place in employment between 1953 and 1969 we decided that the longer time scale was worth the loss in accuracy. In 1967 an unusually large number of corrections was made to industrial classifications of establishments and business units (see *Ministry of Labour Gazette*, March 1969). Although the mid-year 1966 estimates for regions were recalculated to take account of these corrections it was not practicable to make corrections for smaller areas, and this factor must be borne in mind when comparisons are made between 1969 and 1967 data for Humberside. Tables 6-12 present the basic employment data used in the Unit's analyses.

Description of models

10A.10. In each industry, for each sex and separately for North and South Humberside, a linear regression with time was estimated from the past data for the ratio between local and national numbers of employees. In the case of manufacturing and extractive industry the relation was of the form:

$$(1) \ldots\ldots\ldots\ldots \quad R = a + bT$$

where R is the numbers of employees on North or South Humberside for males or females divided by total employment, males or females in Great Britain and T is time ($T = 0$ in 1950, etc.). For construction and service industries the relation was of a similar form.

$$(2) \ldots\ldots\ldots\ldots \quad Z = c + dT$$

where Z is R divided by the ratio of the population of each area to the population of Great Britain. The regression constants a and c give the statistical 'base' values for R and Z respectively in 1850 (not, of course, the actual value in that year) and the regression coefficients b and d give the increases in R and Z respectively per annum.

10A.11. This form of regression equation (rather than the simpler one in which the dependent variable was just local numbers of employees) was chosen among other reasons to take account of the fact that demographic changes in the country as a whole are likely to lead to a substantial deceleration in the rate of growth of the working population in the next 15 years. The expected changes in working population are:

Year	1951	1961	1986	1871	1981
No. '000	23.228	24.774	25.583	25,373	28.249

If all areas were to maintain their previous trend rates of growth in employment, there would over the country as a whole be a demand for very many more employees in 1981 than are likely to be available on demographic grounds. By comparing the rate of growth on Humberside with the national rate throughout we automatically make allowance for this factor, by the implicit assumption that the effects of this national change on Humberside's rate of growth of employment are likely to be similar to those in the country as a whole. The reasonableness of this assumption lies in the likelihood that if measures are required to hold back the rate of growth of labour demand to fit with the likely national supply, they will be of a general deflationary kind likely to effect the level of demand in nearly all types of activity and in all parts of the country.

10A.12. For manufacturing industry we have not made our relationships dependent on local population. This is because, by and large, the market for goods manufactured in Humberside is national or international, and the size of the local population has relatively little importance in determining demand. But for service industries for which much demand is locally oriented, although there are services catering to a substantially wider market (e.g. the docks), it seemed likely that the more sophisticated relationship based on size of population would give better results for service industry as a whole.

10A.13. The residuals from equations *(1)* and *(2)* (see para. 10A.10) were examined along with the correlation coefficient and Durbin-Watson statistics before judging the feasibility of using the regressions for projection purposes. Tables 13, 14, 15 and 16 list particulars of the regression equations for the individual industries and for totals of extractive, manufacturing, construction and service industries.

10A.14. In addition to the linear equation we have used, we also tested a logarithmic relationship which gave similar results. More sophisticated equations, including a T^2 term, or a time-lagged variable, had to be excluded because ten readings are quite inadequate to permit accurate estimation of the parameters of such an equation.

Forecasts of future trends in employment

10A.15. If equations *(1)* and *(2)* are to be used to predict Humberside's future employment, an industrial breakdown of employment in Great Britain in the forecast year is required. The official Great Britain forecasts included in the National Plan* were based on an analysis of inter-industry relationships deriving from the SAM† model of the economy as well as on direct information collected from industry. Those forecasts have been revised up to 1971 in the light of subsequent economic developments and have been divided between males and females by examining the changing ratio between the sexes in each industry. The details are given in Table 17. It should be emphasised that these forecasts were prepared soon after devaluation, when the economic prospects for individual industries were particularly uncertain. Later revisions to forecasts for individual industries, which could be considerable, would, however, be unlikely substantially to alter the overall pattern of changes in employment on Humberside. For 1881 estimates were made for the broad categories of extractive, manufacturing, construction and service employment in the light of the growing proportion of service employment in the total (see para. 5.5).

10A.16. The forecasts for employment on Humberside in 1871 and 1981 are given in Table 17. They are based on the assumption that the trend since 1953, as measured by equations *(1)* and *(2)*, will continue into the future, i.e. that whatever the average rate of growth of the ratio between Humberside employment and employment in Great Britain may have been over the 15 years 1953-87 in each industrial group, the same rate of growth will continue unchanged for the 14-year period 1867-81. As explained in the main text, these forecasts have to be reconsidered in the light of information about the future of particular industries in the Area.

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* Cmnd. 2764, HMSO, 1965.

† Social Accounting Matrix, see para. 2.15 op. cit.

Annex 10A—Tables

*Employee activity rates

TABLE 10A.1

Year	North Humberside		South Humberside		Humberside		Great Britain	
	males	females	males	females	males	females	males	females
1951	72	28	73	24	73	28	78	35
1961	74	32	79	30	78	31	78	39
1966	75	37	78	32	78	35	78	40
1971	75	37	76	32	75	35	73	41
1981	72	38	72	35	72	37	70	43

* Total employees as a percentage of home population aged 15 and over. The home population consists of the civilian population plus armed forces, British and foreign, stationed in the area

Source: Based on material supplied by the Department of Employment and Productivity.

Home population aged 15 and over

TABLE 10A.2

'000

Year	North Humberside		South Humberside		Humberside		Great Britain	
	males	females	males	females	males	females	males	females
1951	157·7	176·4	98·1	101·0	255·8	277·4	17,882·2	20,044·2
1961	161·8	180·0	104·6	109·5	288·5	289·5	18,717·2	20,727·0
1966	167·8	184·8	111·3	114·4	279·1	298·2	18,526·8	21,339·7
1971	173·6	189·8	114·2	117·8	287·8	307·6	19,884·0	21,593·0
1981	168·4	203·0	125·3	128·7	313·7	331·7	21,084·0	22,603·0

Source: General Register Office.

Supply of employees

TABLE 10A.3

'000

Year	North Humberside		South Humberside		Humberside		Great Britain	
	males	females	males	females	males	females	males	females
1951	113·8	48·9	71·9	24·3	185·7	73·2	13,811	7,099
1961	120·1	58·3	83·1	32·6	203·2	90·9	14,572	7,880
1966	126·0	67·8	86·5	36·5	212·4	104·3	14,885	8,841
1971	130·2	70·2	86·8	37·7	217·0	107·9	14,425	8,917
1981	135·6	77·1	90·2	45·0	225·8	122·1	14,808	9,892

Source: Based on material supplied by the Department of Employment and Productivity.

Industrial groupings used in the Humberside Study

TABLE 10A.4

	Equivalent groupings	
Description of grouping	Minimum list headings	Social-accounting matrix
1. Agriculture, forestry, fishing	001-3	1
2. Mining and quarrying	101-3, 109	2, 3
3. Food, drink and tobacco	211-9, 229, 231, 239, 240	4, 5
4. Chemicals and allied industries	261-3, 271-7	6, 7, 8
5. Metal manufacture	311-3, 321, 322	9, 10
6. Engineering and electrical goods	331-9, 341-2, 349, 351-2, 361-5, 369	11
7. Shipbuilding and marine engineering	370	12
8. Vehicles	381-5, 389	13, 14, 15
9. Metal goods not elsewhere specified	391-5, 399	16
10. Textiles	411-9, 421-3, 429	17
11. Bricks, pottery, glass, cement, etc.	461-4, 469	19, 20
12. Timber, furniture, etc.	471-5, 479	21
13. Paper, printing and publishing	481-3, 486, 489	22
14. Other manufacturing	431-3, 441-6, 449, 450, 491-6, 499	18, 23, 24
15. Construction	500	25
16. Gas, electricity and water	601-3	26, 27, 28
17. Transport and communications	701-7, 709	29
18. Distributive trades	810, 820, 831-2	30
19. Services not elsewhere specified	980, 871, 873, 875, 879, 881-9, 891, 899	31
20. Public administration, education and health	872, 874, 901, 906	32

Total employees 1953, 1959-67: North Humberside males*

TABLE 10A.5

'000

INDUSTRIES	1953	1959	1960	1961	1962	1963	1964	1965	1966	1967
PRIMARY										
1. Agriculture, forestry, fishing	8·4	8·7	8·3	8·2	8·5	7·8	7·5	7·0	8·4	6·6
2. Mining and quarrying	0·2	0·2	0·2	0·2	0·2	0·2	0·2	0·2	0·2	0·2
Sub-total (1, 2)	9·6	8·9	8·5	8·4	8·7	8·0	7·8	7·2	6·6	6·7
MANUFACTURING										
3 Food, drink and tobacco	5·6	5·8	5·8	5·7	5·6	5·7	5·6	5·6	5·7	5·8
4. Chemicals and allied industries	8·1	7·6	7·8	7·8	7·9	7·8	8·1	8·3	8·1	7·9
5. Metal manufacture	3·0	3·3	3·4	3·4	3·4	3·6	3·7	3·6	3·7	3·7
6. Engineering and electrical goods	4·0	4·3	4·8	5·0	5·4	5·3	5·0	5·3	5·5	5·5
7. Shipbuilding and marine engineering	6·3	5·5	5·2	5·3	5·0	4·5	4·5	4·7	4·9	4·9
8. Vehicles	3·2	5·4	6·2	6·5	7·0	7·5	7·4	7·3	7·3	7·2
9. Metal goods not elsewhere specified	1·6	1·6	1·9	2·1	2·1	1·8	2·1	1·9	1·9	2·0
10. Textiles	0·6	0·3	0·3	0·2	0·3	0·3	0·4	0·4	0·4	0·3
11. Bricks, pottery, glass, cement, etc.	1·9	1·6	1·8	1·8	1·9	2·1	2·1	2·1	2·1	2·1
12. Timber, furniture, etc.	3·7	3·6	4·2	4·1	4·3	4·2	4·4	5·0	4·7	4·5
13. Paper, printing and publishing	1·5	1·6	1·7	2·0	2·0	2·0	1·9	2·2	2·1	1·9
14. Other manufacturing industries	1·9	2·1	2·2	2·0	2·1	2·1	2·3	2·4	2·6	2·4
Sub-total (3-14)	42·4	43·1	45·2	46·1	47·1	46·6	47·4	48·0	49·0	48·1
15. Construction	8·2	10·4	9·6	8·7	10·1	10·4	10·7	10·8	11·0	10·2
SERVICES										
16. Gas, electricity and water	2·6	2·8	2·5	2·6	2·7	2·9	2·8	2·8	2·8	2·8
17. Transport and communications	24·6	23·0	22·6	22·6	22·0	21·9	21·4	20·6	20·6	20·2
18. Distributive trades	12·7	13·0	13·1	12·8	12·6	12·9	12·6	13·7	13·7	12·1
19. Miscellaneous services	6·6	7·4	7·3	7·3	7·6	8·4	8·2	8·6	8·6	7·9
20. Public administration, health and education	8·9	10·5	9·5	10·5	11·7	12·4	12·8	13·3	13·6	14·0
Sub-total (16-20)	55·4	56·6	55·1	55·9	56·8	58·5	57·9	59·1	59·4	57·0
TOTAL	115·7	118·9	118·4	120·1	122·7	123·7	123·8	126·1	126·0	122·0

* Figures do not always add to totals due to rounding.
Source: Department of Employment and Productivity.

Total employees 1953, 1959-67: North Humberside females*

TABLE 10A.6

'000

INDUSTRIES	1953	1959	1960	1961	1962	1963	1964	1965	1966	1967
PRIMARY										
1. Agriculture, forestry, fishing 2. Mining and quarrying†	0·9	0·7	0·7	0·8	0·7	0·7	0·7	0·6	0·5	0·5
Sub-total (1, 2)	1·0	0·7	0·7	0·8	0·8	0·8	0·7	0·6	0·6	0·5
MANUFACTURING										
3. Food, drink and tobacco	3·5	3·8	3·9	3·7	3·9	3·9	4·1	3·7	3·8	3·7
4. Chemicals and allied industries	3·9	3·9	4·2	4·3	4·3	4·1	4·4	4·4	4·7	4·4
5. Metal manufacture	0·4	0·5	0·5	0·5	0·5	0·5	0·4	0·5	0·5	0·5
6. Engineering and electrical goods	0·8	1·0	1·1	1·2	1·3	1·2	1·4	1·3	1·5	1·4
7. Shipbuilding and marine engineering	0·2	0·2	0·2	0·2	0·2	0·2	0·2	0·2	0·2	0·2
8. Vehicles	1·3	1·7	1·9	1·8	2·1	1·9	2·3	2·1	2·0	1·8
9. Metal goods not elsewhere specified	2·4	2·5	3·0	2·5	2·4	2·8	2·6	2·4	2·5	2·3
10. Textiles	1·1	0·5	0·5	0·5	0·5	0·5	0·4	0·4	0·4	0·4
11. Bricks, pottery, glass, cement, etc.	0·3	0·3	0·3	0·3	0·4	0·4	0·5	0·5	0·5	0·4
12. Timber, furniture, etc.	1·4	1·2	1·3	1·2	1·2	1·2	1·2	1·3	1·0	1·0
13. Paper, printing and publishing	1·2	1·1	1·4	1·4	1·5	1·5	1·3	1·5	1·5	1·4
14. Other manufacturing industries	1·5	2·0	2·0	2·0	2·1	2·1	2·0	2·2	2·0	1·8
Sub-total (3-14)	17·9	18·4	20·3	19·8	20·4	20·0	20·9	20·7	20·8	19·8
15. Construction	0·3	0·4	0·4	0·4	0·5	0·5	0·5	0·5	0·7	0·5
SERVICES										
16. Gas, electricity and water	0·3	0·2	0·2	0·3	0·3	0·3	0·3	0·3	0·3	0·2
17. Transport and communications	1·7	2·1	2·0	2·1	2·0	2·1	2·1	2·1	2·2	2·0
18. Distributive trades	7·5	12·1	12·7	13·2	13·8	14·2	13·8	14·9	15·4	13·9
19. Miscellaneous services	8·5	9·8	9·8	10·0	10·4	10·8	11·1	11·1	11·8	11·1
20. Public administration, health and education	8·7	10·9	11·3	11·7	13·1	13·9	14·2	15·4	15·8	15·8
Sub-total (16-20	28·8	35·1	36·0	37·3	38·5	41·4	41·5	43·8	45·5	43·2
TOTAL	48·0	54·7	57·4	58·3	61·1	62·8	63·8	65·7	67·8	63·8

* Figures do not always add to totals due to rounding.

† Figures too small to be of any significance.

Source: Department of Employment and Productivity.

Total employees 1953, 1959-67: South Humberside males*

TABLE 10A.7

'000

INDUSTRIES	1953	1959	1960	1961	1962	1963	1964	1965	1966	1967
PRIMARY										
1. Agriculture, forestry, fishing	9·2	8·2	8·3	7·5	7·4	8·1	7·8	7·0	7·2	6·9
2. Mining and quarrying	1·1	1·3	1·3	1·3	1·3	1·3	1·2	1·1	1·1	1·1
Sub-total (1, 2)	10·3	9·5	9·8	6·8	8·7	9·4	9·0	8·2	8·3	8·0
MANUFACTURING										
3. Food, drink and tobacco	4·1	4·8	4·7	4·9	5·0	5·2	4·9	4·1	4·5	5·2
4. Chemicals and allied industries	2·9	4·1	4·5	4·9	4·9	4·6	4·7	4·7	5·4	4·9
5. Metal manufacture	14·1	16·8	17·5	19·8	17·8	19·0	19·7	20·2	17·9	17·2
6. Engineering and electrical goods	1·8	1·8	2·0	2·1	2·0	1·7	1·8	1·8	2·2	3·6
7. Shipbuilding and marine engineering	3·3	2·6	2·6	2·6	2·5	2·8	2·2	2·5	2·4	2·5
8. Vehicles	0·6	0·6	0·5	0·4	0·3	0·1	0·2	0·2	0·2	0·2
9. Metal goods not elsewhere specified	0·2	0·2	0·2	0·2	0·2	0·2	0·2	0·2	0·3	0·2
10. Textiles	0·3	0·8	0·9	1·1	1·3	1·1	1·3	1·3	1·5	1·5
11. Bricks, pottery, glass, cement, etc.	1·3	1·4	1·4	1·3	1·4	1·4	1·4	1·5	1·6	1·5
12. Timber, furniture, etc.	1·1	0·9	0·9	1·0	1·0	1·0	0·9	0·9	0·9	0·9
13. Paper, printing and publishing	0·9	1·0	1·0	1·1	1·1	1·1	1·1	1·3	1·3	1·4
14. Other manufacturing industries	0·1	0·4	0·5	0·3	0·5	0·6	0·6	0·8	0·6	0·6
Sub-total (3-14)	30·6	35·1	36·6	39·8	37·7	38·7	39·2	39·6	38·7	39·7
15. Construction	7·4	6·9	8·0	8·4	9·4	7·8	9·1	10·5	10·7	10·2
SERVICES										
16. Gas, electricity and water	1·3	1·6	1·8	1·5	1·8	1·7	1·7	1·8	1·8	1·8
17. Transport and communications	9·5	8·8	8·7	8·4	8·4	8·3	8·3	8·3	8·7	8·7
18. Distributive trades	5·8	7·4	7·4	7·6	8·0	7·1	8·0	6·9	7·0	6·0
19. Miscellaneous services	3·4	3·7	3·7	3·9	4·4	4·4	4·8	5·5	6·0	5·7
20. Public administration, health and education	4·2	4·7	4·6	4·9	4·9	5·2	5·1	5·1	5·1	5·3
Sub-total (16-20)	24·2	28·2	26·2	26·4	27·4	26·7	27·8	27·6	28·8	27·5
TOTAL	72·6	77·7	80·4	83·1	83·2	82·7	85·1	85·9	86·6	85·4

* Figures do not always add to totals due to rounding.

Source: Department of Employment and Productivity.

Total employees 1953, 1959-67: South Humberside females*

TABLE 10A.8

'000

INDUSTRIES	1953	1959	1960	1961	1962	1963	1964	1965	1966	1967
PRIMARY										
1. Agriculture, forestry, fishing	1·2	1·1	1·2	1·2	1·1	1·0	1·2	1·1	1·2	1·1
2. Mining and quarrying†										
Sub-total (1, 2)	1·2	1·1	1·2	1·2	1·1	1·0	1·2	1·2	1·2	1·1
MANUFACTURING										
3. Food, drink and tobacco	3·3	4·9	5·1	5·8	5·8	6·4	5·6	5·1	5·9	6·2
4. Chemicals and allied industries	0·2	0·3	0·4	0·5	0·6	0·5	0·6	0·5	0·5	0·6
5. Metal manufacture	1·3	1·4	1·3	1·4	1·3	1·6	1·3	1·5	1·5	1·5
6. Engineering and electrical goods	0·2	0·1	0·2	0·2	0·1	0·1	0·2	0·2	0·2	0·3
7. Shipbuilding and marine engineering	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1	0·1
8. Vehicles	0·2	0·2	0·2	0·2	0·1	0·1	0·1	0·1	0·1	0·1
9. Metal goods not elsewhere specified†										
10. Textiles	1·0	1·0	1·0	1·0	1·1	1·0	1·1	1·0	1·1	0·9
11. Bricks, pottery, glass, cement, etc.	0·1	0·2	0·1	0·1	0·1	0·1	0·1	0·2	0·2	0·2
12. Timber, furniture, etc.	0·2	0·1	0·1	0·2	0·2	0·2	0·2	0·2	0·2	0·1
13. Paper, printing and publishing	0·2	0·2	0·2	0·2	0·2	0·2	0·2	0·3	0·3	0·3
14. Other manufacturing industries	0·8	0·9	1·0	0·9	1·0	1·1	1·0	1·0	1·2	0·9
Sub-total (3-14)	7·7	9·4	9·8	10·5	10·7	11·5	11·5	10·2	11·3	11·2
15. Construction	0·2	0·2	0·2	0·2	0·4	0·3	0·3	0·4	0·4	0·4
SERVICES										
16. Gas, electricity and water	0·1	0·2	0·2	0·2	0·3	0·3	0·2	0·3	0·2	0·2
17. Transport and communications	0·9	1·0	1·0	1·0	1·0	1·0	0·9	1·0	1·1	1·1
18. Distributive trades	5·3	7·3	7·2	7·6	7·3	7·7	7·3	7·5	7·5	7·3
19. Miscellaneous services	8·0	5·4	5·5	5·8	6·0	5·1	8·3	8·8	7·1	5·9
20. Public administration, health and education	3·9	5·4	5·6	6·1	5·5	6·4	7·0	7·0	7·6	8·1
Sub-total (15-20)	15·4	19·3	19·5	20·6	21·2	21·4	21·8	22·5	23·5	23·6
TOTAL	25·5	30·0	30·8	32·6	33·3	34·2	34·8	34·2	36·5	36·3

* Figures do not always add to totals due to rounding.

† Figures too small to be of any significance.

Source, Department of Employment and Productivity.

Total employees 1953, 1959-67: Humberside*

TABLE 10A.9

'000

INDUSTRIES	1953	1959	1960	1961	1962	1963	1964	1965	1966	1967
PRIMARY										
1. Agriculture, forestry, fishing	20·7	18·7	18·5	17·6	17·7	17·7	17·2	15·8	15·4	15·1
2. Mining and quarrying	1·4	1·5	1·6	1·8	1·6	1·5	1·4	1·4	1·3	1·3
Sub-total (1, 2)	22·1	20·2	20·1	19·2	19·3	19·3	18·6	17·2	16·7	16·4
MANUFACTURING										
3. Food, drink and tobacco	17·4	18·9	18·5	20·1	20·4	21·2	21·2	18·6	19·9	20·9
4. Chemicals and allied industries	15·1	15·9	16·9	17·4	17·5	17·1	17·7	18·0	18·8	17·8
5. Metal manufacture	18·9	22·0	22·7	25·1	23·1	24·7	25·2	26·0	23·6	22·9
6. Engineering and electrical goods	6·8	7·2	7·8	8·5	8·8	8·3	8·4	8·5	9·4	10·8
7. Shipbuilding and marine engineering	10·0	8·4	8·0	8·3	7·8	7·4	7·0	7·5	7·6	7·7
8. Vehicles	5·2	7·8	8·9	8·9	8·5	9·6	10·1	9·8	9·6	9·5
9. Metal goods not elsewhere specified	4·2	4·5	5·1	4·9	4·7	4·6	4·9	4·5	4·7	4·5
10. Textiles	2·8	2·6	2·7	2·9	3·2	2·9	3·1	3·2	3·4	3·1
11. Bricks, pottery, glass, cement, etc.	3·8	3·5	3·7	3·6	3·8	4·0	4·2	4·4	4·4	4·2
12. Timber, furniture, etc.	6·4	6·0	6·6	6·4	6·7	6·5	6·7	7·3	6·8	6·5
13. Paper, printing and publishing	3·8	4·0	4·3	4·7	4·8	4·8	4·6	5·3	5·3	5·0
14. Other manufacturing industries	4·3	5·4	5·7	5·3	5·7	5·9	5·9	6·4	6·5	5·8
Sub-total (3-14)	98·6	108·1	111·9	116·0	115·9	117·0	118·1	118·5	120·0	118·6
15. Construction	18·0	17·8	18·2	18·7	20·3	19·0	20·5	22·2	22·9	21·2
SERVICES										
16. Gas, electricity and water	4·4	4·7	4·6	4·8	5·0	5·1	5·0	5·2	5·1	5·1
17. Transport and communications	36·7	34·9	34·2	33·9	33·4	33·3	32·6	31·9	32·6	32·1
18. Distributive trades	31·4	39·8	40·5	41·1	41·6	41·9	41·7	43·0	43·6	39·3
19. Miscellaneous services	24·7	26·3	26·3	27·0	28·6	29·7	30·5	32·0	33·6	31·8
20. Public administration, health and education	26·7	31·4	31·2	33·2	36·3	37·8	38·1	40·9	42·3	43·2
Sub-total (16-20)	122·8	137·1	138·8	140·2	144·8	148·0	148·9	163·0	157·2	151·2
TOTAL	259·6	281·3	287·0	294·1	300·3	303·2	307·1	311·8	316·7	307·5

* Figures do not always add to totals due to rounding.
Source: Department of Employment and Productivity

Total employees 1953, 1959-67: Great Britain males*

TABLE 10A.10

'000

INDUSTRIES	1953	1959	1960	1961	1962	1983	1964	1965	1988	1967
PRIMARY										
1. Agriculture. forestry. fishing	642·1	580·9	538·1	508·2	486·2	472·9	448·4	410·3	391·4	364·7
2. Mining and quarrying	880·8	813·6	749·1	714·3	684·6	668·6	641·0	607·6	559·2	537·1
Sub-total (1. 2)	1.502·8	1.374·6	1.287·2	1.222·6	1.180·7	1.142·4	1.089·4	1.017·8	950·6	901·8
MANUFACTURING										
3. Food, drink and tobacco	485·9	461·9	451·2	458·2	469·8	470·7	466·8	471·5	470·7	485·7
4. Chemicals and allied industries	349·9	377·7	385·2	386·8	379·6	378·7	371·1	376·1	380·6	380·4
6. Metal manufacture	520·4	610·7	646·1	560·4	530·3	628·5	551·7	659·3	547·1	528·8
6. Engineering and electrical goods	1.304·8	1.426·7	1.491·9	1.566·1	1.598·8	1.577·0	1.596·7	1.654·6	1.682·8	1.729·9
7. Shipbuilding and marine engineering	280·7	267·7	252·9	240·5	234·1	216·2	203·0	198·7	193·3	193·7
8. Vehicles	700·9	749·7	792·0	773·2	764·3	757·4	757·8	750·6	741·7	714·4
9. Metal goods not elsewhere specified	296·8	331·0	352·0	364·7	366·3	368·3	375·5	389·3	382·8	385·7
10. Textiles	406·2	379·8	381·0	379·4	373·7	370·1	371·5	367·2	366·8	353·1
11. Bricks. pottery. glass. cement, etc.	253·7	261·7	260·0	265·4	289·9	265·9	276·7	278·0	271·5	276·1
12. Timber. furniture. etc.	236·8	226·1	232·0	230·2	231·2	230·1	233·4	239·5	234·4	247·7
13. Paper. printing and publishing	324·4	370·9	389·0	398·9	405·6	410·7	410·9	417·3	422·5	422·6
14. Other manufacturing industries	383·8	358·6	371·6	376·4	375·6	376·3	379·4	381·6	380·8	373·2
Sub-total (3-14)	5.603·2	5.701·6	5.904·9	5.998·2	5.898·8	5.946·9	5.993·2	6.083·7	6.084·8	6.092·0
15. Construction	1.291·8	1.388·9	1.382·9	1.436·0	1.486·2	1.526·8	1.578·9	1.606·8	1.624·9	1.545·2
SERVICES										
16. Gas. electricity and water	337·2	335·3	330·3	337·1	343·6	362·2	355·4	359·9	370·9	371·0
17. Transport and communications	1.469·1	1.464·6	1.449·4	1.461·5	1.475·2	1.455·0	1.403·6	1.387·3	1.358·1	1.362·8
18. Distributive trades	1.128·0	1.337·0	1.354·6	1.348·0	1.384·3	1.409·6	1.404·9	1.393·1	1.374·2	1.290·3
19. Miscellaneous services	1.132·0	1.312·8	1.321·6	1.359·7	1.423·0	1.467·6	1.513·0	1.546·0	1.561·7	1.525·7
20. Public administration. health and education	1,357·8	1.385·1	1.388·2	1.409·0	1.454·2	1.514·3	1.490·7	1.517·4	1.560·1	1.621·2
Sub-total (16-20)	6.416·1	5.834·7	5.844·1	6.915·3	6.080·3	6.198·7	6.167·6	6.202·7	6.226·1	6.170·9
TOTAL	13.713·0	14.279·7	14.429·1	14,571·9	14.746·0	14.814·8	14.828·6	14.910·2	14.885·2	14.710·2

* Figures do not always add to totals due to rounding.

Source. Department of Employment and Productivity.

Total employees 1953, 1959-67: Great Britain females*

TABLE 10A.11

'000

INDUSTRIES	1953	1959	1960	1861	1962	1963	1964	1965	1986	1967
PRIMARY										
1. Agriculture. forestry. fishing	102·7	84·0	92·7	90·6	89·9	93·1	89·1	83·9	82·7	78·9
2. Mining and quarrying	20·0	24·4	23·3	23·6	23·0	22·3	22·6	23·0	22·8	22·4
Sub-total (1, 2)	122·7	118·4	116·0	114·1	112·9	115·4	111·7	106·9	106·6	101·3
MANUFACTURING										
3. Food. drink and tobacco	352·7	346·1	348·2	354·7	356·6	350·8	349·5	347·5	348·8	353·7
4. Chemicals and allied industries	142·1	144·2	148·0	146·9	142·9	142·0	142·7	144·3	148·6	142·7
6. Metal manufacture	81·9	71·5	76·6	76·6	74·0	73·8	76·2	77·2	76·4	73·2
8. Engineering and electrical goods	432·2	604·0	651·0	568·0	677·2	576·5	607·9	620·2	639·0	621·7
7. Shipbuilding and marine engineering	13·6	13·2	13·1	12·3	12·4	11·8	11·6	11·6	11·8	12·0
8. Vehicles	126·2	117·0	123·7	121·2	117·9	116·7	118·6	116·3	115·2	111·6
9. Metal goods not elsewhere specified	171·3	182·4	197·8	198·3	181·8	188·3	198·9	204·1	205·8	192·7
10. Textiles	566·6	475·0	473·1	464·1	435·2	421·3	417·8	406·7	395·6	362·1
11. Bricks. pottery. glass, cement, etc.	83·4	78·0	79·8	81·6	82·6	77·9	79·9	79·8	80·4	78·9
12. Timber. furniture. etc.	69·6	68·8	60·0	59·9	57·9	66·4	68·6	59·7	59·4	59·7
13. Paper. printing and publishing	184·8	202·7	211·3	216·7	220·0	216·4	216·6	219·2	222·0	216·8
14. Other manufacturing industries	599·4	542·0	666·0	568·6	664·7	562·8	553·0	650·5	548·1	528·3
Sub-total (3-14)	2.812·6	2.734·8	2.847·5	2.869·0	2.833·2	2.783·7	2.831·0	2.837·0	2.850·7	2.753·4
16. Construction	47·0	65·3	68·9	76·0	80·1	80·5	81·7	87·9	93·2	85·5
SERVICES										
18. Gas. electricity and water	38·1	42·4	43·2	44·9	46·3	48·5	50·7	53·1	54·8	57·2
17. Transport and communications	246·4	246·8	249·0	259·8	262·0	256·4	255·1	261·6	264·6	271·0
18. Distributive trades	1,119·8	1.404·4	1.453·4	1.481·3	1.627·0	1.548·2	1.569·1	1.599·1	1.628·6	1.660·6
19. Miscellaneous services	1.669·8	1.656·3	1.655·3	1.560·6	1.615·5	1.631·4	1.692·1	1.716·7	1.721·4	1.694·8
20. Public administration. health and education	1,214·6	1.471·2	1.516·6	1.576·3	1.643·0	1.695·6	1.753·7	1.814·6	1.922·0	2,021·6
Sub-total (16-20)	4.177·5	4.721·1	4.817·4	4.921·8	6.093·8	5.180·1	6.320·7	5.446·1	5.591·3	6.605·0
TOTAL	7.159·6	7.639·6	7.849·9	7.979·9	8.119·9	8.169·8	8.344·9	8.477·5	8.641·0	8.645·6

* Figures do not always add to totals due to rounding.
Source: Department of Employment and Productivity.

Total employees 1953, 1959-67: Great Britain*

TABLE 10A.12

'000

INDUSTRIES	1853	1959	1950	1961	1962	1963	1984	1965	1988	1967
PRIMARY										
1. Agriculture, forestry, fishing	744·7	654·9	630·9	598·7	578·1	566·0	537·4	494·2	474·2	443·6
2. Mining and quarrying	880·9	838·0	772·4	737·8	717·5	591·8	683·8	630·5	582·0	559·5
Sub-total (1, 2)	1,625·6	1,492·9	1,403·3	1,336·5	1,293·8	1,257·8	1,201·0	1,124·7	1,056·2	1,003·1
MANUFACTURING										
3. Food, drink and tobacco	818·5	797·9	799·4	812·9	825·4	821·6	816·2	819·0	819·4	839·4
4. Chemicals and allied industries	492·0	522·0	533·3	533·7	522·4	518·6	513·7	520·4	529·0	523·0
6. Metal manufacture	602·3	582·2	621·5	837·1	504·3	602·3	628·0	636·5	623·5	603·0
6. Engineering and electrical goods	1,736·9	1,929·7	2,042·9	2,133·1	2,175·8	2,153·5	2,204·7	2,274·8	2,321·8	2,351·7
7. Shipbuilding and marine engineering	294·2	280·8	265·8	252·7	246·5	227·8	214·6	210·3	205·1	205·7
8. Vehicles	826·1	886·7	815·7	894·4	882·2	874·1	878·4	888·9	857·0	825·8
9. Metal goods not elsewhere specified	468·2	513·4	548·8	563·1	558·1	558·6	574·4	593·3	598·4	578·4
10. Textiles	972·7	854·8	854·1	843·5	809·0	791·4	789·3	773·8	762·3	715·2
11. Bricks, pottery, glass, cement, etc.	337·1	329·8	339·8	347·0	352·5	343·8	355·6	357·8	351·9	355·0
12. Timber, furniture, etc.	295·4	284·8	292·0	290·1	289·1	286·5	291·9	299·3	293·7	307·4
13. Paper, printing and publishing	509·2	573·6	600·9	615·6	625·8	626·2	827·4	836·5	844·5	639·4
14. Other manufacturing industries	953·1	900·7	937·7	944·0	940·2	928·2	832·4	932·0	929·0	901·4
Sub-total (3-14)	8,315·8	8,436·6	8,752·5	8,867·2	8,832·1	8,730·7	8,824·2	8,920·7	8,935·6	8,845·5
15. Construction	1,338·8	1,434·2	1,461·8	1,511·0	1,588·3	1,807·3	1,660·6	1,694·7	1,718·0	1,630·7
SERVICES										
16. Gas, electricity and water	375·2	377·7	373·5	382·1	389·9	400·8	406·1	413·0	425·8	428·2
17. Transport and communications	1,704·6	1,711·3	1,698·4	1,721·3	1,737·3	1,711·5	1,658·8	1,648·8	1,622·7	1,633·8
18. Distributive trades	2,248·6	2,741·5	2,808·0	2,828·3	2,911·3	2,957·8	2,974·0	2,992·2	3,002·7	2,850·8
19. Miscellaneous services	2,891·8	2,869·2	2,876·9	2,920·2	3,038·5	3,099·1	3,205·1	3,281·6	3,283·2	3,220·4
20. Public administration, health and education	2,572·4	2,856·4	2,904·8	2,984·3	3,097·2	3,209·9	9,244·3	3,332·2	3,482·0	3,642·6
Sub-total (16-20)	9,592·6	10,555·9	10,661·6	10,837·2	11,174·2	11,378·8	11,488·3	11,847·9	11,816·4	11,775·9
TOTAL	20,872·6	21,819·3	22,279·0	22,551·9	22,865·8	22,974·5	23,173·5	23,387·6	23,528·2	23,255·7

* Figures do not always add to totals due to rounding.
Source: Department of Employment and Productivity.

Regression parameters and statistics: North Humberside males

TABLE 10A.13

INDUSTRIES	Regression constant	Regression coefficient	Correlation coefficient	Durbin-Watson statistic
PRIMARY				
1. Agriculture, forestry, fishing	0·013784	0·000218	0·85	2·18
2. Mining and quarrying	0·000132	0·000014	0·86	2·17
Sub-group (1, 2)	0·006144	0·000065	0·77	1·89
MANUFACTURING				
3. Food, drink and tobacco	0·014438	—0·000166	0·96	1·26
4. Chemicals and allied industries	0·021812	—0·000059	0·26	1·20
5. Metal manufacture	0·006502	0·000084	0·80	1·68
6. Engineering and electrical goods	0·003032	0·000014	0·43	1·61
7. Shipbuilding and marine engineering	0·019404	0·000261	0·67	0·98
8. Vehicles	0·003746	0·000409	0·96	0·49
9. Metal goods not elsewhere specified	0·005742	—0·000036	0·42	2·19
10. Textiles	0·001248	—0·000024	0·41	1·18
11. Bricks, pottery, glass, cement. etc.	0·007082	0·000034	0·27	2·75
12. Timber, furniture, etc.	0·014780	0·000297	0·82	1·75
13. Paper, printing and publishing	0·004398	0·000029	0·38	1·96
14. Other manufacturing industries	0·004766	0·000095	0·77	1·24
Sub-group (3-14)	0·007474	0·000031	0·75	1·72
15. Construction	0·748104	0·001465	0·18	2·39
SERVICES				
16. Gas, electricity and water	0·881228	0·000403	0·06	1·56
17. Transport and communications	1·888798	—0·013487	0·87	1·53
18. Distributive trades	1·204946	—0·009915	0·59	1·05
19. Miscellaneous services	0·645142	—0·001946	0·46	1·97
20. Public administration, health and education	0·642528	0·020898	0·91	1·38
Sub-group (16-20)	1·126468	—0·004857	0·70	0·88
TOTAL	0·008266	0·000005	0·21	1·22

Regression parameters and statistics: North Humberside females

TABLE 10A.14

INDUSTRIES	Regression constant	Regression coefficient	Correlation coefficient	Durbin-Watson statistic
PRIMARY				
1. Agricultura. forestry. fishing	0·009244	—0·000132	0·73	1·89
2. Mining and quarrying*				
Sub-group (1. 2)	0·008430	—0·000173	0·75	1·17
MANUFACTURING				
3. Food. drink and tobacco	0·010015	0·000062	0·50	1·96
4. Chemicals and allied Industries	0·025584	0·000325	0·86	2·55
5. Metal manufacture	0·005408	0·000079	0·45	2·01
6. Engineering and electrical goods	0·001900	0·000023	0·59	2·71
7. Shipbuilding and marine engineering	0·013995	0·000189	0·87	1·32
8. Vehicles	0·009524	0·000541	0·88	1·80
9. Metal goods not elsewhere specified	0·015192	—0·000178	0·68	2·23
10. Textiles	0·001800	—0·000053	0·81	1·44
11. Bricks. pottery. glass. cement, etc.	0·001800	0·000287	0·71	1·21
12. Timber. furniture. etc.	0·024926	—0·000381	0·74	1·73
13. Paper. printing and publishing	0·005956	0·000052	0·38	2·70
14. Other manufacturing industries	0·002646	0·000075	0·77	1·86
Sub-group (3-14)	0·008318	0·000065	0·76	1·94
15. Construction	0·862178	0·002115	0·13	2·45
SERVICES				
16. Gas, electricity and water	0·873508	—0·019304	0·57	1·45
17. Transport and communications	0·811888	0·006479	0·49	2·19
18. Distributive trades	0·756158	0·019189	0·90	1·48
19. Miscellaneous services	0·604806	0·009789	0·91	2·49
20. Public administration. health and education	0·749988	0·010895	0·80	1·41
Sub-group (16-20)	0·700022	0·013181	0·93	1·23
TOTAL	0·005312	0·000091	0·92	1·26

[*] There was no regression calculated for this order—numbers were too small to be of any significance.

Regression parameters and statistics: South Humberside males

TABLE 10A.15

INDUSTRIES	Regression constant	Regression coefficient	Correlation coefficient	Durbin-Watson statistic
PRIMARY				
1. Agriculture, forestry, fishing	0·012064	0·000366	0·87	1·38
2. Mining and quarrying	0·001198	0·000049	0·94	1·37
Sub-group (1, 2)	0·005938	0·000156	0·88	1·84
MANUFACTURING				
3. Food, drink and tobacco	0·009424	0·000058	0·29	1·27
4. Chemicals and allied industries	0·007868	0·000353	0·91	1·73
5. Metal manufacture	0·028020	0·000447	0·68	1·21
8. Engineering and electrical goods	0·001178	0·000013	0·18	0·99
7. Shipbuilding and marine engineering	0·009792	0·000131	0·47	1·69
8. Vehicles	0·001048	—0·000051	0·87	1·27
9. Metal goods not elsewhere specified	0·000658	—0·000007	0·28	2·07
10. Textiles	—0·000018	0·000251	0·98	2·32
11. Bricks, pottery, glass, cement, etc.	0·005018	0·000026	0·38	1·86
12. Timber, furniture, etc.	0·004838	—0·000065	0·80	1·29
13. Paper, printing and publishing	0·002450	0·000033	0·58	1·00
14. Other manufacturing industries	0·000042	0·000107	0·87	2·06
Sub-group (3-14)	0·005602	0·000061	0·85	1·72
16. Construction	0·841962	0·009411	0·41	2·14
SERVICES				
16. Gas, electricity and water	0·749060	0·008230	0·61	2·59
17. Transport and communications	1·157700	—0·006683	0·44	0·62
18. Distributive trades	1·056900	—0·009290	0·51	1·85
19. Miscellaneous services	0·458618	0·009206	0·83	0·86
20. Public administration, health and education	0·813114	—0·000829	0·18	0·95
Sub-group (18-20)	0·847494	—0·003922	0·73	2·22
TOTAL	0·005186	0·000039	0·93	2·14

Regression parameters and statistics: South Humberside females

TABLE 10A.16

INDUSTRIES	Regression constant	Regression coefficient	Correlation coefficient	Durbin-Watson statistic
PRIMARY				
1. Agriculture, forestry, fishing	0·010732	0·000167	0·59	2·00
2. Mining and quarrying*				
Sub-group (1, 2)	0·008922	0·000111	0·52	1·70
MANUFACTURING				
3. Food, drink and tobacco	0·009118	0·000549	0·83	1·50
4. Chemicals and allied industries	0·000848	0·000195	0·90	1·66
5. Metal manufacture	0·015458	0·000269	0·62	3·20
6. Engineering and electrical goods	0·000402	—0·000006	0·21	1·76
7. Shipbuilding and marine engineering	0·006988	0·000095	0·86	1·15
8. Vehicles	0·002068	—0·000074	0·74	1·60
9. Metal goods not elsewhere specified*				
10. Textiles	0·001558	0·000086	0·91	2·52
11. Bricks, pottery, glass, cement, etc.	0·000840	0·000077	0·47	1·35
12. Timber, furniture, etc.	0·002884	0·000001	0·01	1·36
13. Paper, printing and publishing	0·000768	0·000028	0·46	0·83
14. Other manufacturing industries	0·001266	0·000042	0·73	2·61
Sub-group (3-14)	0·002622	0·000097	0·90	1·82
15. Construction	0·608340	0·007297	0·21	1·98
SERVICES				
16. Gas, electricity and water	0·684548	0·010886	0·20	1·48
17. Transport and communications	0·702548	—0·000841	0·07	1·49
18. Distributive trades	0·951936	—0·007101	0·84	1·85
19. Miscellaneous services	0·548188	0·002228	0·27	1·12
20. Public administration, health and education	0·698902	0·006904	0·84	1·73
Sub-group (16-20)	0·739618	—0·000304	0·12	1·12
TOTAL	0·003528	0·000043	0·89	1·70

* There were no regressions calculated for these orders—numbers too small to be of any significance.

Humberside and Great Britain total employee projections 1971 and 1981*

TABLE 10A.17

'000

Industries	1971								1991							
	North Humberside		*South Humberside*		*Humber-side*	*Great Britain*			*North Humberside*		*South Humberside*		*Humber-side*	*Great Britain (rounded to whole numbers)*		
	males	*females*	*males*	*females*	*Total*	*males*	*females*	*Total*	*males*	*females*	*males*	*females*	*Total*	*males*	*females*	*Total*
PRIMARY																
1. Agriculture, forestry, fishing	5·2	0·4	5·8	0·6	12·0	283·1	60·1	343·2								
2. Mining and quarrying	0·2	0·0	0·9	0·0	1·1	399·7	18·2	416·9								
Sub-total (1, 2)	5·4	0·4	6·5	0·8	13·1	682·8	76·3	759·1	3·6	0·3	4·8	0·6	9·3	441	49	490
MANUFACTURING																
3. Food, drink and tobacco	6·3	4·1	6·1	7·5	22·0	479·5	361·9	841·3								
4. Chemicals and allied industries	7·7	4·7	6·7	0·7	18·8	373·2	145·1	518·3								
5. Metal manufacture	3·9	0·5	19·9	1·5	25·8	531·9	72·5	604·4								
6. Engineering and electrical goods	5·5	1·9	2·4	0·2	9·7	1.854·2	659·3	2,313·6								
7. Shipbuilding and marine engineering	4·1	0·2	2·1	0·1	6·5	167·4	9·7	177·1								
8. Vehicles	8·7	2·3	0·2	0·1	11·3	709·5	110·8	819·1								
9. Metal goods not elsewhere specified	2·0	2·3	0·2	0·0	4·5	394·1	203·0	597·1								
10. Textiles	0·2	0·2	1·7	1·0	3·1	333·4	333·4	666·8								
11. Bricks, pottery, glass, cement, etc.	2·0	0·8	1·4	0·2	4·2	258·8	75·1	333·9								
12. Timber, furniture, etc.	6·0	1·0	0·8	0·2	7·0	237·7	69·4	297·1								
13. Paper, printing and publishing	2·1	1·5	1·3	0·3	6·2	411·0	211·8	622·8								
14. Other manufacturing industries	2·4	2·1	0·8	1·1	8·4	359·6	498·5	858·1								
Sub-total (3-14)	46·9	21·1	41·8	12·9	124·5	5.909·3	2,738·2	8.647·5	47·8	22·2	42·4	14·8	127·2	5.664	2.886	8.330
15. Construction	10·4	0·6	9·9	0·4	21·3	1.502·8	95·9	1.598·7	13·1	0·8	13·2	0·6	27·7	1.842	118	1.990
SERVICES																
16. Gas, electricity and water	2·9	0·2	1·9	0·3	5·3	386·1	59·8	425·7								
17. Transport and communications	18·4	2·2	7·6	1·0	29·2	1.288·1	263·4	1.549·6								
18. Distributive trades	11·2	16·9	6·3	7·1	40·5	1.260·1	1.540·1	2,800·2								
19. Miscellaneous services	9·9	12·7	6·2	7·0	34·8	1.651·7	1.753·8	3,405·5								
20. Public administration, health and education	17·0	20·8	6·1	10·3	54·2	1.765·9	2,389·2	4.155·1								
Sub-total (16-20)	58·4	51·8	28·1	25·7	164·0	6.329·9	8,006·1	12.336·0	60·1	98·3	28·9	29·1	186·4	6.890	8.860	13.720
TOTAL	123·1	73·9	86·1	39·8	322·9	14,424·9	8,918·5	23,341·3	124·9	91·9	89·3	45·1	350·6	14.808	9,992	24.500

* Figures do not always add to totals due to rounding.

11 SOME HYPOTHETICAL PLANS FOR HUMBERSIDE

The nature of the plans

11.1. While it was not the function of this Study to formulate a master plan for Humberside four hypothetical sketch plans were prepared to assess the merits of various possibilities (see Maps 7-10). This Chapter describes their preparation and analysis: a summary of this work and of the findings is in Chapter 4.

11.2. The total land area identified in Chapter 4 and Map 4 as physically suitable for development is large enough both to allow for industrial development on a massive scale and to accommodate an additional population of over two million. Even with the maximum population growth postulated in Chapter 2 this would leave a choice of sites and of urban structures. We have concentrated on four possible broad strategies, each framed to accommodate the extra 750,000 population assumed in the maximum case, together with the natural growth of the indigenous population. They were chosen partly because they appeared to match the disposition of the areas revealed by our physical sieve and partly because they conformed in some degree to various theoretical proposals which have been canvassed as suitable for city regions. Current plans for Humberside were used as the basis for the first stages of the development in all four Cases, but for subsequent stages wide-ranging proposals were incorporated in an attempt to bring out as many general lessons as possible.

11.3. The locations of the main urban and industrial areas incorporated in each of the four sketch plans are shown in outline on Maps 7-10. For ease of reference the schemes have been labelled:

Case 1: *Two Major Cities*
Case 2: *The Radiating Form*
Case 3: *The Dispersed Form*
Case 4: *The Linear Form*

The titles are not intended to convey specific technical specifications.

Assumptions

11.4. Basic assumptions which were common to all the sketch plans so that their characteristics could be assessed on a comparable basis are given in paras. 11.5-11.13.

Population

11.5. The assumed build-up of population is shown in Table 11e (against the entry "All cases'). All four schemes provided for a total population in year 2001 of 902,000 on North Humberside and 852,000 on South Humberside, of which 395,000 and 450,000 respectively would be accommodated on new sites additional to those already covered by current development plans, planning permission, etc. Table 11a shows how these numbers would be allocated in each of the four schemes.

Employment

11.6. Employment patterns were based on the arbitrary assumption that throughout the period 45 per cent of the total population would be working and that of these 50 per cent would be in service industries, 10 per cent in construction, 5 per cent in light manufacturing industry and 35 per cent in general manufacturing and primary industries. Such assumptions imply that a marginally higher proportion of the working population would be employed in manufacturing, and a lower proportion in services, than the analysis in Chapter 5 finally concluded; but these differences do not significantly affect this analysis.

11.7. About one-third of total employment—most general manufacturing and some construction—was assumed to be in the specifically identified major industrial areas, including the estuarial sites. About one-seventh was allocated to central business districts. A typical pattern of urban centres of various sizes was assumed, with large centres emerging to serve areas with populations between 100,000 and 300,000 and an appropriate level of service employment. The remaining employment was distributed evenly over other urban land.

11.8. A decision on national grounds in favour of a MIDA at Spurn Bight (see para. 4.9) would locate substantial employment in that area and have major planning consequences. In the absence of such a decision we could not assume any such development and have therefore only provided for a small increase in employment in the river bank area east of Hull, although all the sketch plans for the north bank were so designed as to leave open the possibility of major development. Some employment could arise by extension of the industrial areas at Salt End even without a MIDA, but pending a decision on the major issue no allowance has been made for this in this exercise.

Densities

11.9. In the sketch plans all land uses, other than the major industrial areas, were labelled 'urban areas'. For comparability of results a single average population density of 22 persons per acre was assumed over the whole new urban area, which allowed for a variety of non-residential uses. The densities within the residential areas would average about 36 persons per acre net (see Annex 11A). This represents a compact urban pattern, but one which it would be possible to achieve because of the freedom from existing physical constraints. High flats, which are expensive to construct, would not be necessary. Typically, four-fifths of all households could be in houses and one-fifth in three-storey flats.

Roads

11.10. The road systems used for all the sketch plans were basically developments of the network approved in principle by the Ministry of Transport (as outlined in Chapter 9). A Humber bridge just upstream of Barton-Hessle on the line at present being investigated, and appropriate links from it to the main east-west roads, were also included.

11.11. On the north bank the existing scheme for a major approach route as far as Gilberdyke was extended to Hull. For the south bank all the plans provided for the development of the present A18 trunk road to motorway standards as far east as Ulceby, including the Brigg bypass, replacement of Keadby Bridge and eventual provision of a new road around Scunthorpe, which, purely for the purposes of this exercise, was taken to the south of the existing built-up area.

TABLE 11a Hypothetical sketch plans: population build-up and distribution 1966–2001*

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ase	Area	1966	1971	1976	1981	1986	1991	2001
1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ll cases	All areas	772	826	898	971	1,131	1,291	1,754
	North bank total	469	491	529	567	636	707	902
	Existing development, development plans, etc.	469	491	†507	507	507	507	507
	New areas (see below)	—	—	22	60	129	200	395
	South bank total	303	335	369	404	493	584	852
	Existing development, development plans, etc.	303	335	369	†402	402	402	402
	New areas (see below)	—	—	—	2	91	182	450
. Two Major Cities	North bank	—	—	22	60	129	200	395
	Lockington	—	—	22	60	129	200	395
	South bank	—	—	—	2	91	182	450
	Limber	—	—	—	—	—	50	317
	Grimsby	—	—	—	2	51	51	51
	Scunthorpe	—	—	—	—	15	50	50
	Barton	—	—	—	—	25	32	32
2. The Radiating Form	North bank	—	—	22	60	129	200	395
	N. Cave	—	—	—	—	57	107	184
	S. Cave	—	—	—	28	28	28	28
	Ellerker	—	—	22	22	22	22	22
	Swanland	—	—	—	—	12	12	12
	Hornsea	—	—	—	10	10	31	149
	South bank	—	—	—	2	91	182	450
	Barton	—	—	—	—	25	81	349
	Grimsby	—	—	—	2	51	51	51
	Scunthorpe	—	—	—	—	15	50	50
3. The Dispersed Form	North bank	—	—	22	60	129	200	395
	N. Cave	—	—	22	60	129	129	129
	Lockington	—	—	—	—	—	71	140
	Hornsea	—	—	—	—	—	—	126
	South bank	—	—	—	2	91	182	450
	Limber	—	—	—	—	—	—	250
	Barton	—	—	—	—	36	112	112
	Grimsby	—	—	—	2	38	38	38
	Scunthorpe	—	—	—	—	15	32	50
4. The Linear Form	North bank	—	—	22	60	129	200	395
	Lockington	—	—	—	—	—	38	233
	Walkington	—	—	—	6	75	108	108
	Skidby	—	—	22	54	54	54	54
	South bank	—	—	—	2	91	182	450
	Barton	—	—	—	—	38	38	38
	Deepdale	—	—	—	—	—	—	47
	Wootton	—	—	—	—	—	—	84
	Limber	—	—	—	—	—	—	103
	Laceby	—	—	—	—	—	56	90
	Scunthorpe	—	—	—	—	15	50	50
	Grimsby	—	—	—	2	38	38	38

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* Figures do not always add to totals due to rounding

† Figures are based on targets for population intake adopted early in the work of the Unit and used for the computer programmes Later work led to different annual rates of intake being adopted, and there are, therefore inconsistencies between this table and, for example ,Table 2a (see para. 2.11). Later work also suggested that the estimates of the capacity of land allocated in development plans etc., used in this exercise were slightly low for North Humberside and high for South Humberside.

11.12. The sketch plans did not make use of areas of Holderness where development could be located if there is major industrial growth on the north Humber bank below Hull. However, in anticipation of such growth, all the plans incorporate a major east-west route round the northern limits of the built-up areas of Hull. The first section of such a route would link road A1079 with the proposed Beverley bypass to give Hull docks and city centre important outlets north-westwards. The route could be readily extended beyond Salt End when required.

11.13. The northern approach to the proposed Humber bridge was connected with the main east-west links to Hull and to the western bypass to Beverley, the need for which has been accepted in principle. The southern approach was connected to the proposed Brigg bypass. Since an additional crossing of the Humber east of Hull may eventually be needed (see para. 4.96) the plans were framed to leave room for such a possibility in the line Paull-East Halton Skitter.

11.14. In addition to these major routes a basic network of possible inter-urban links was devised intuitively, including an improved road between Scunthorpe and the Humber bridge and a new link between Grimsby and the bridge via a major intersection near Ulceby. This network was needed for computing differences in volumes of traffic that might be induced by alternative development patterns. These roads followed what were believed to be physically feasible routes, but they were not meant as precise proposals and have not been shown in Maps 7-10.

Assessment of the alternative strategies

11.15. The strategies have been assessed and compared with each other on the basis of each of a number of important planning considerations including physical factors, urban hierarchy, sewerage, transportation costs, and the ease with which development could be staged.

Physical factors

11.16. Almost all the land allocated as new 'urban areas' in Case 1, *Two Major Cities*, and in Case 4, *The Linear Form*, and a high proportion in the other two Cases would be on the chalk or drift-covered dip slopes of the Wolds which are to a large extent physically homogenous. The site for the new city at Barton in Case 2 is a large area of comparatively stark open land with few trees, much of which has been singled out as of particularly high agricultural quality. On the other hand the sites to the south, where a Limber new city would be located in Cases 1 and 3, are more varied scenically and include Brocklesby Park and extensive belts of woodland (these areas have been excluded from the density calculations) which would be valuable attributes to city development—for landscaping, shelter and recreation. On North Humberside the chalk dip slope areas are scenically attractive and there might therefore be misgivings about the desirability of large-scale development, particularly in respect of the areas around Bishop Burton and Risby Park, though only Case 4, *The Linear Form*, would involve building there. The area to the north, centred broadly on South Dalton, while also scenically attractive is in the form of a large amphitheatre which would make a fine natural setting for a new city. This characteristic was fully exploited in Case 1 with Lockington new city and on a smaller scale with Lockington new town in Case 3, *The Dispersed Form*.

11.17. Case 2, *The Radiating Form*, and Case 3, *The Dispersed Form*, both embraced a development on the Jurassic platform at the foot of the Wolds scarp between Market Weighton and North Cave. This would be an exceptionally pleasant site with a south-westerly aspect and views across Trent Falls. It is nicely wooded with some parklands, thus providing some very desirable residential areas. Development here would, on the other hand, intrude into the foreground of views from the Wolds and in the northern part could seriously disturb Houghton Wood—a 435-acre site of special scientific interest noted for its birds and insects. The agricultural importance of this area is rather less than that of the Wolds areas.

11.18. Case 2, *The Radiating Form*, also extended development (assumed to be at a low density) westwards from Hull along the southerly edge of the Wolds at Swanland on to land identified in the East Riding Development Plan as of landscape value. This is a rolling chalk slope with a southerly aspect offering views over the Humber and forming a distinctive element in the main approach to Hull. The further extensions west to Ellerker and South Cave would, however, be west of the proposed A63(T) bypass and thus clear of the attractive Brantingham Village and the dales and scarp slopes of the Wolds.

11.19. The counterparts of the North Cave area on South Humberside would be the sites south of Scunthorpe and at Broughton, which were included for development in all the plans. These are good areas for buildings, which would be unlikely to attract strong objections on landscape grounds, nor, in the case of the land south of Scunthorpe, on agricultural grounds. All the plans also included some southwards and westwards extensions of the agreed development areas of Grimsby and Cleethorpes. Building here would have relatively little impact on landscape or agriculture.

11.20. Case 2, *The Radiating Form*, and Case 3, *The Dispersed Form*, assumed development in the extensive boulder clay areas of Holderness, mostly on grade III agricultural land. It is possible that these clay soils in a rather exposed easterly situation would offer a slightly less hospitable environment than the warmer soils further west. They are however generally satisfactory for building purposes, subject, because of their variability, to local load-bearing tests for large buildings.

11.21. Altogether, in terms of attractive environment for possible new residential areas the various strategies produced only slight differences, some of which could be further obscured by the detailed style and form chosen for the development itself. However there were marginal disadvantages attached to Case 2, *The Radiating Form*, because it relied heavily on the development of rather open land south of Barton, of significantly placed areas of landscape value at Swanland and of somewhat exposed areas at Holderness.

11.22. The grades of agricultural land required for each development are given in Table 11b. All the south bank schemes rely heavily on the use of grade II, and with Cases 2 and 4, grade I agricultural land. On the north bank Cases 2 and 3 were best, being based mainly on grade III areas; the development with Cases 1 and 4 was almost wholly on grade II land.

The urban hierarchy

11.23. The introduction of new towns into an area where there is already a network of urban centres would be bound to produce a complicated series of interactions between the new and the old. This is an important issue because it can affect the level and convenience of the services that the new arrivals would be able to enjoy at different stages in the build-up, and can lead to wasteful duplication of expensive facilities unless the old and the new are integrated into a phased programme.

11.24. In this field there can be an infinite grading of possibilities between a concentration and a dispersal of facilities. There are some mathematical techniques, at present relatively crude, for evaluating such factors as the competitive strength of developing centres, but we were unable to devise start would have to be made in the Limber section and not, as is assumed in Table 11a, at the two ends.

11.37. All four alternatives assumed a southerly expansion of Grimsby-Cleethorpes, for which the former airfield at Waltham, which has reasonable external road connections, would provide a suitable general industrial area. The relatively small expansion at Scunthorpe, which again was common to all four alternatives, could be associated with some development in an industrial area adjacent to the Trent, possibly by linking existing industrial uses at Flixborough, Gunness and Crosby. Such an area could offer large sites with ready access to main road and rail connections together with facilities for coastal shipping, but possibly with above-average foundation costs.

11.38. On North Humberside the position is difficult to deal with solely on the basis of the particular schemes we have put forward, not least because the possibility of major industrial development on the estuarial sites east of Hull was excluded from consideration. The only industrial land east of Hull incorporated in the schemes was restricted to that in the Docks Board ownership at Salt End. the employment potential here should not be drastically out of line with the capacity of existing or already proposed residential areas in Hull and Hedon.

11.39. Elsewhere the most suitable industrial sites would appear to be those which could be developed for workers from the North Cave, South Cave and Ellerker areas (Cases 2 and 3). Sites already proposed for industrial use between Brough and North Ferriby could be extended. They would be well placed astride the main road and rail approaches to Hull and physically attractive, being located between the scarp slopes of the York Wolds and the upper reaches of the Humber estuary. There is already a nucleus of technologically based industries in this district. These considerations would also apply to the flat areas at Ellerker Sands (Table 4a, Site B), although this possibility was not included in any of the sketch plans.

11.40. Near Lockington (Cases 1, 3 and 4) an extensive flat area in the Hull valley lying north of the airfield and between the Hull-Bridlington railway and road A164 would provide large sites for industry. Foundation costs on these alluvial soils could be above average and the area might be regarded by industrialists as somewhat remote from Humberside's main approach routes The same criticism of the communications could apply to any industrial areas that might be opened at Hornsea (Cases 2 and 3).

11.41. A site for a major industrial area to serve the Walkington-Skidby sections of a north bank linear form (Case 4) has not been discovered. It was therefore assumed that this scheme would rely on expansion in the existing and proposed industrial areas at Brough and in the former railway marshalling yards in the western part of Hull It could conceivably also look to research and similar establishments located within its built-up area.

11.42. However there are two other possibilities which, although not actually covered by any of the four Cases have emerged in the course of analysis. First, all the sketch plans allowed for the eventual construction of a new major east-west route north of Hull to serve industrial development on its east side. This road could open up for industry an area north of Cottingham well placed to serve the Walkington-Skidby area and the existing large local authority housing estate at Orchard Park, Hull. There are objections to such a development. it would encroach on the gap between Cottingham and Beverley and it would be within the sight of some of the University's residential accommodation. However the site would not be conspicuous and trees could provide an effective screen. A concentration of power lines at Crayke Beck switching station already disrupts the scene. The second possibility is that a major part of an expansion on North Humberside might be supported by the promotion of Hull as an office centre. In these circumstances not only would the southern section of a north bank linear form (Case 4) acquire a new significance, but there could be a much greater emphasis on a straightforward westerly expansion of Hull into the Skidby and Eppleworth areas identified in Table 4b as sites 7 and 8.

Sewerage

11.43. Possible sewerage layouts for each of the four sketch plans have been considered and outline arrangements to suit each have been devised. Descriptions of these are given in Annex 11B. The investigations have been taken far enough to demonstrate that it would be physically feasible to deal with the drainage from each of the four developments, although the layouts have not been designed in sufficient detail to provide close estimates of total costs.

11.44. Since effluent could not be discharged directly from any of the north bank sites to the lower reaches of the Humber estuary where dilution and other conditions are most suitable, higher standards of sewage treatment would be necessary and costs per person of providing sewerage for major development would be higher than on the south bank.

11.45. For major growth the lowest sewerage cost of all would probably be that arising from a major development in the Limber area. Costs per head in that case would, on a conservative basis, be perhaps £10 below those for an equivalent development on the north bank at Lockington.

11.46. All the Limber development areas were situated on chalk or sand and gravel and further investigation may indicate that the use of soakaways would be possible in that area. It might also be possible to discharge crude sewage direct to the lower reaches of the estuary after maceration. If both these possibilities proved feasible there would be substantial further savings in the cost of sewerage, perhaps amounting to between £40 and £50 per head. Although there would be a four-mile pipeline to the estuary its cost would not be significant when spread over a large population.

11.47. For all the other hypothetical development sites, with the exception of those in the Hornsea area, the differences in sewerage cost per head would be only marginal.

11.48. The most difficult and expensive areas to drain would be those in the Hornsea area (Cases 2 and 3) where costs per head might be as much as £30-£50 higher than at Limber. There the natural drainage pattern is haphazard, and there are several ways in which sewerage could be provided. Pumping would probably be necessary both for foul sewage and surface-water drainage, and balancing ponds would be needed to avoid flooding. The broken terrain would almost certainly give rise to deep trench work in boulder clay and in some areas in waterlogged land. It has been assumed that all foul sewage would be taken to a treatment works south of the area and that effluent, after treatment to a high standard, would be pumped to the Holderness Drain.

11.49. To minimise the cost of sewerage, any large-scale urban development to the east of the River Hull should be located well to the south where it might be possible to arrange for drainage direct to the estuary. The development of such areas, which would be based on those identified in Table 4b as sites 10 and 11, would certainly have to be considered if major industries were to be established on the north bank east of Hull.

11.50. As far as urban form is concerned, the investigation has suggested, though not conclusively, that linear development could lead to higher sewerage cost, particularly where lengthy sewers have to be provided parallel to, but outside, the development. This could occur with Case 4 and also with the North Cave—South Cave—Ellerker development in Case 2. The investigation has also shown that some savings could be made at the northern end of the development at both Leconfield and North Cave by not going beyond the local natural catchment area boundaries. The sites identified in Chapter 4 have been delineated taking this latter factor into account.

Transportation

11.51. A mathematical model (see Annex 11C) was devised to evaluate the traffic implications of the sketch plans. The number of journeys per day expected between each of 70 zones was calculated by a computer programme using assumptions about the distribution of population and employment and about car ownership, the quality of public transport and vehicle occupancy. A second computer programme was used to assign the zone-to-zone vehicle movements to the basic road networks produced intuitively for this purpose for each scheme.

TABLE 11c
Estimated capital costs of hypothetical main road networks

Hypothetical development form	Capital expenditure to 2001 £'000			Cost per head of total population 2001 £			Cost per head of population increase 1968-2001 £		
	Humberside	N. Bank	S. Bank	Humberside	N. Bank	S. Bank	Humberside	N. Bank	S. Bank
(1)	(2)	(3)	(4)	(5)	(5)	(7)	(8)	(9)	(10)
Case 1. *Two Major Cities*	243,785	118,340	125,445	139	131	147	249	273	228
Case 2. *The Radiating Form*	234,603	123,040	111,663	134	136	131	239	284	203
Case 3. *The Dispersed Form*	254,086	137,209	115,877	145	152	137	258	317	213
Case 4. *The Linear Form*	234,415	118,448	116,967	134	131	136	239	274	211

TABLE 11d
Estimated operating costs

Hypothetical development form	Costs per day 2001 £'000				Costs discounted back to 1981							
					Total £'000,000				Per head of total population 2001 £			
	Humber-side	Outside cordon*	Inside cordon		Humber-side	Outside cordon	Inside cordon		Humber-side	Outside cordon	Inside cordon	
			N. Bank	S. Bank			N. Bank	S. Bank			N. Bank	S. Bank
(1)	(2)	(3)	(4)	(6)	(6)	(7)	(8)	(8)	(10)	(11)	(12)	(13)
Case 1. *Two Major Cities*	607	45	290	272	1,202	90	574	538	685	52	636	631
Case 2. *The Radiating Form*	626	35	318	271	1,239	72	631	636	706	41	700	629
Case 3. *The Dispersed Form*	610	39	298	275	1,209	78	586	545	589	44	650	640
Case 4. *The Linear Form*	832	38	285	309	1,250	75	611	584	713	43	677	662

* Journeys outside the Area, i.e. across the cordon, could not be seperately allocated to each bank.

Note: Operating costs for private transport using Ministry of Transport Technical Memorandum No. 5.

TABLE 11e

Estimated total costs per head *

£

Hypothetical development form	Total Humberside	Capital Costs			Operating Costs			
		Humberside	N. Bank	S. Bank	Humberside	Outside cordon †	Inside cordon	
							N. Bank	S. Bank
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Case 1. *Two Major Cities*	755	70	65	73	685	52	638	631
Case 2. *The Radiating Form*	773	67	68	85	706	41	700	629
Case 3. *The Dispersed Form*	761	72	76	68	689	44	650	640
Case 4. *The Linear Form*	780	67	65	68	713	43	677	662

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* Estimated capital and operating costs have been reduced to a common basis of discounted current value in 1981, using a discount rate of 8 per cent.

† Journeys outside the Area, i.e. across the cordon, could not be separately allocated to each bank.

11.52. The final output gave estimated patterns of vehicle movements for 1981, 1991 and 2001, together with estimates of the capital costs of main road and junction construction and of daily operating costs, taking into account the running costs of vehicles and the value of the occupants' time. The quality of answers from such an exercise is largely determined by the quality of the assumptions that are fed into it.

11.53. The computer tapes of the material used are available for further analyses. The material could be improved by incorporating data collected by the recent land-use/transportation surveys at Hull and Grimsby.

11.54. In Tables 11c, d, and e the computer outputs have been consolidated to provide comparative costs for each of the four hypothetical sketch plans. Table 11c deals with capital costs and Table 11d with operating costs. In Table 11e both types of cost have been reduced to a common basis (that of the discounted values at 1981) in order to provide comparative total estimates of both construction and operating costs.

11.55. On this basis there would be a difference of about £33 million in the estimated capital costs of providing a main road network for a combination of the most expensive scheme for each bank as against a combination of the two cheapest. Such a difference is equivalent to about 1½ per cent of the possible total capital cost of the development covered by these hypothetical schemes.

11.56. All the north bank schemes appeared more expensive than those for the south bank if measured in terms of the capital cost per head of the increase in population achieved (Table 11c, cols. 8-10) mainly because a larger proportion of the expenditure on the north bank is attributable to the needs of the existing population. Some of this expenditure would, however, be necessary even if no major expansion took place; the method used has not enabled this factor to be separately evaluated.

11.57. Daily operating costs in 2001 would range between £607,000 and £632,000 (Table 11d). In cols. 6-9 these costs have been discounted back to capital value in 1981, or in other words to the capital sums which would produce, at a rate of interest of 8 per cent, the annual sums involved. These estimates are about ten times as large as the similarly discounted estimated capital costs of building the roads.

11.58. The estimates in Table 11d imply that the linear forms examined might have somewhat higher operating costs than the more traditional urban forms. Case 2 on the north bank—a form of discontinuous linear development—showed the highest operating costs of all. Among the large city developments there is nothing to choose between Lockington (Case 1), Limber (Case 1) and Barton (Case 2). The dispersed developments in Case 3 would be rather more expensive than more concentrated schemes.

11.59. When the capital costs and operating costs were brought together (Table 11e) the difference in *per capita* costs of the alternative schemes appeared remarkably small. The overall discounted cost of *The Linear Form* (Case 4), the most expensive, worked out at £1,367 million. The *Two Major Cities* (Case 1), the cheapest, was only £43 million (about 3 per cent) less. These differences are so small that, having regard to the limitations in the techniques used, they are probably not statistically significant. Nevertheless the results do support the intuitive supposition that there could be cost disadvantages attaching to dispersed forms of development such as *The Radiating Form* chosen for the north bank in Case 2, which has a very extended pattern of settlement relying heavily on Hull. Costs also appeared to be on the high side on both banks with *The Linear Form* (Case 4); but it is possible that these could be offset by the better opportunities this form of development might offer for a system of rapid mass transit. Whether such a system would be a viable proposition even in the long term on Humberside, where the maximum population proposed would not approach conurbation size and where widely dispersed low density employment would be characteristic of the Area's basic manufacturing industries, might depend on technological developments yet to come. Dispersing the north bank development to North Cave, Lockington and Hornsea (Case 3) might be more expensive than concentration in a single city at Lockington. From the restricted viewpoint of costs of providing for an increase of population (as against total population) the schemes on the south bank might be marginally cheaper than those on the north bank.

Staging of development

11.60. Table 11a gives for each of the four sketch plans one way in which the overall rate of growth postulated for each period to 2001 could be allocated to the various areas. Opportunities for flexibility in development are an important consideration, bearing in mind the possibilities of major technological change.

11.61. For the north bank Case 1 would involve a relatively early commitment to the building of a major new city on a virgin site. Once started the design and rate of development could not be readily changed, which could be a major disadvantage. With Case 3, *The Dispersed Form*, the commitment would be spread over three smaller developments—North Cave, Lockington and Hornsea—which were programmed for development consecutively. Any one of these three, if particularly successful, could be expanded beyond the size adopted for this exercise and growth generally would be flexible. There is ample experience available in building new towns of this size, though the actual rates of building assumed here have never been approached and to achieve them it might well be necessary for a simultaneous start to be made on all three schemes. Consecutive staging of the schemes would, however, yield earlier provision of a full range of services for the inhabitants of each centre.

11.62. *The Radiating Form* (Case 2) and *The Linear Form* (Case 4) have characteristics in common as far as staging is concerned, although of the two a north bank linear scheme expanding from Hull would offer better access to the existing city services in the early stages of building. These schemes would permit considerable flexibility in planning and timing and could be more readily curtailed than schemes involving the creation of large free-standing new towns and cities (Cases 1 and 3).

11.63. On the south bank all the schemes tested assumed that initial growth would be absorbed around the existing towns of Grimsby-Cleethorpes and Scunthorpe. This programming might not turn out to be the best to meet some of the distributions and timing of industrial development that could emerge in the extensive areas along the Humber bank, nor would it enable an early start to be made with the opening up of the good industrial site in the Melton Ross-Kirmington area. Nothing inherent in any of the four south bank schemes would, however, prevent an earlier staging of development nearer this strategically placed area if required. There would be elements of rigidity in the two schemes which involve concentration in very large cities—Limber in Case 1 and Barton in Case 2—and some rigidity in the two sizeable towns of Case 3

Conclusion

11.64. The exercise described in this Chapter was no more than a preliminary reconnaissance. In order to keep it to manageable proportions most assumptions were kept common to all the sketch plans with the result that the analysis has been concerned more with alternative locations than with differences between possible alternative structures for the proposed urban areas. The latter would require detailed examination after the decision on major expansion had been taken and the general level, timing and location of expansion had been laid down.

11.65. Only in some of the issues considered could costs be quantified on a comparative basis within Humberside, i.e. transportation, sewerage and the differences between the losses to agriculture of developing land of different grades. Although sewerage costs did vary somewhat, the very large costs of transportation were similar for all cases tested. On agricultural land the conclusion emerged that while grade I land can generally be avoided, most of the preferred sites tend to be on grade II land. As regards actual construction costs, there would not be much variation between one site and another among those chosen for consideration, except that foundation costs could be slightly higher on some boulder clay sites than on some gravel or chalk sites. Thus the cost assessments did not indicate a strong preference for any one form of development.

11.66. As regards expanding existing towns, those limited areas which would be required at Grimsby-Cleethorpes and Scunthorpe appeared to be free of serious objections. As far as Hull is concerned straightforward major peripheral expansion was not examined in any of the four sketch plans, because our physical sieve revealed few possibilities except to the west, where there were some amenity objections. Nevertheless a well-designed but strictly controlled expansion in this direction is a possible way of locating a substantial population in the context of major growth on Humberside. Our transportation studies did not suggest that peripheral expansion of these three existing urban areas would give rise to unusual problems of congestion, though if such development possibilities are to be followed up it would be essential to examine the likely consequences more thoroughly, making use of the detailed transport studies which have just become available for Hull and Grimsby.

11.67. Of the 'green field' sites examined the major one at Limber emerged as the best on South Humberside. It is physically attractive, easy to build on, centrally placed in relation to the south bank industrial areas and to the potential site for general industry at Kirmington, suitably located to provide major central area facilities for South Humberside, far enough away from urban areas on the north bank to reduce the risk of traffic overload on a Humber bridge, and relatively cheap to provide with sewerage. On the north bank the physically most attractive sites examined were at Lockington and at North Cave, but a new city on the former site would be wastefully competitive with Hull and would have an overwhelming effect on Beverley. Because of the decision to exclude a MIDA and its possible associated development from this exercise we did not investigate the possibilities of development east of Hull which could accompany industrial growth downriver from Salt End. If there were a need to expand Hull eastward we would not differ from the view taken by Abercrombie* a quarter of a century ago that a satellite growth would be preferable to any further continuation of peripheral growth over very low-lying areas. In Chapter 4 we have tentatively suggested two areas—near Preston and Withernsea—where this might take place.

11.68. The results did not demonstrate any major advantages for the forms of linear development tested. This, however, is far from conclusive because our linear patterns were very long and narrow and the concept was rigidly applied so that development extended indiscriminately over, for example, grade I agricultural land in North Lindsey and over good landscape around Bishop Burton. A full assessment of linear forms, for example of 'directional grids' as expounded in the South Hampshire study,† would require the preparation of detailed urban designs including, in particular, appropriate public transport systems.

11.69. The dispersed forms, which included towns of appreciable size, would provide substantial planning flexibility and are more within present design experience than large new cities. Some forms may have higher than average transport costs. On the south bank this form of development would not provide some of the advantages of a major new city at Limber.

11.70. City centre provision is an important issue on Humberside, split as it is by the barrier of the estuary. Assuming major expansion on both banks and a continuing demand for access to large city centres, the physical circumstances on Humberside are such that South Humberside would need a major city centre of its own rather than a series of town centres with the main higher order services remaining solely in Hull.

11.71. Tentative conclusions only are possible on the basis of the analytical work described in this Chapter. No one Case clearly emerged as superior to the rest. Nevertheless the work did point to a new city at Limber, together with some expansion of Grimsby and Scunthorpe and a major town in the North Cave area with substantial westward peripheral expansion of Hull as possible solutions on South and North Humberside respectively. However this investigation was designed primarily to probe the general feasibility of carrying out major expansion rather than to suggest a blueprint for a possible master plan. Before the latter could be prepared it would be necessary, as is normal with any large town-planning project, to test in depth a limited range of possible preferred solutions for dealing with whatever type of expansion may eventually be decided upon. While these more penetrating studies would reveal a great deal more about ways in which expansion could best be achieved, we are confident that they would not significantly effect our general conclusion that it is physically feasible to carry out a large expansion in areas which would be very attractive to live in and which would not present any unusual costs in construction or in providing utility services.

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* See footnote on p. 21.

† *South Hampshire Study.* HMSO, 1966.

Annex 11A

Hypothetical outline plans, 2001: population densities

Definitions

11A.1. Conventionally there are three commonly used levels of density measurement: overall, gross, and net. Overall population density is the number of persons living in an urban area divided by the total area of the land. With gross density the land areas occupied by certain specific non-residential uses such as industry, secondary schools and major open spaces, are excluded from the calculation. With net density the only areas included in the calculation are those used for residential and for closely related purposes, e.g. small play spaces for children and residential access roads.

11A.2. Residential density is expressed in terms of population, i.e. persons per acre, or in terms of residential accommodation, i.e. numbers of dwellings, rooms, or bed-spaces per acre. The two measures can be linked at a point in time by an occupancy rate, e.g. average number of persons per dwelling.

Density assumptions for the outline plans

11A.3. Only two broad categories of urban land use were distinguished in the outline plans:

a major industrial areas;
b all other urban uses, including areas for industry not covered by *a*.

It was assumed that about a third of all employment would be within the major industrial areas; but employment densities there would be low, perhaps below five workers per acre, and inclusion of such areas in an overall density calculation would be largely meaningless. For all four plans a single average population density was applied to the second category of uses only.

The calculations

11A.4. A theoretical urban hierarchy was postulated comprising:

a basic residential units of approximately 5,000 population related to the catchment area of a primary school and conceived as an area free of through-traffic;
b districts made up of groupings of ten of the smaller units and provided with a district shopping centre, secondary schools, etc.;
c major urban groupings of two or more districts provided with city centre facilities.

11A.5. Land-use standards were formulated for each of these component units covering all uses except residential, and excluding the requirements for major industrial areas. Details are given in Table 1: for an urban grouping of 100,000 population or more these uses amount to about 18 acres per 1,000 population.

11A.6. For comparison the land-use requirements (excluding the major industrial areas) for an urban area of 300,000 population were worked out using the standards in Table 1 for the non-residential uses and densities of 27, 36 and 45 persons per acre for residential development. At 36 persons per acre the calculation could be set out as follows:

	Acres
Residential units (5,000 population)	
Net residential area (i.e. 5,000 ÷ 36)	139
Ancillary uses (see Table 1, i.e. 6·2 × 5)	31
Total each residential unit	170
Districts (50,000 population)	
Total 10 residential units	1,700
Ancillary uses (see Table 1, i.e. 9·1 × 50)	455
Total each district	2,155
Urban area (300,000 population)	
Total 8 districts	12,930
Ancillary uses (see Table 1, i.e. 3·0 × 300)	900
Total	13,830

The results for these three different residential densities were:

Net residential density	Land requirements for 300,000 population, excluding major industrial areas	Equivalent population density
persons per acre	*acres*	*persons per acre*
27	18,410	18
36	13,830	22
45	12,210	25

11A.7. The average density applied to the areas of 'all other urban uses' in the hypothetical plans was 22 persons per acre. This presupposes, therefore, that the average density for the net residential areas would be 36 persons per acre. If the 'major industrial areas' identified in these plans had been such that they would be likely to be developed at a conventional density of 50 workers per acre, the overall urban density would, incidentally, have worked out at about 20 persons per acre.

Annex 11A–Tables

Land-use standards for non-residential uses excluding major industrial areas

TABLE 11A.1

Acres per 1,000 population

Land use	Residential units (5,000 population)		Districts (50,000 population)		Urban groupings (100,000 + population)		All areas
	Item	Quan-tity	Item	Quan-tity	Item	Quan-tity	
Education	Primary schools	1·0	Secondary schools	2·0	Further and higher education	1·0	4·0
Shopping	Local convenience	0·2	District centre	0·1	Central area	0·2	0·5
Social services, offices, entertainment, etc.	Church, public house, etc.	2·0	District services	2·0	Offices, entertainment, etc.	0·8	4·8
Open space	Playgrounds, etc.	2·0	Parks and playing fields	2·5	City park, etc.	0·5	5·0
Transport	Access roads, etc.	1·0	Distributor roads, bus stations, etc.	2·0	Primary routes, stations, etc.	0·5	3·5
Industry*	—	—	Light industry	0·6	—	—	0·5
Total	—	6·2	—	9·1	—	3·0	18·3

* Excluding major industrial areas and assuming service industries are mainly located with other uses.

Annex 11B

Hypothetical outline plans 2001: schematic sewerage plans

11B.1. The separate system of sewerage appeared to be the best for conditions in Humberside and provisional sewerage layouts were prepared on this basis for each of the four outline plans; estimates were made of the likely quantities of foul sewage and surface-water run-off.

11B.2. With the help of the three river authorities the degrees of treatment to be given to sewage before discharges of effluent into the various rivers and streams were assessed, as were the improvements required to the existing watercourses to enable them to carry the greatly increased quantities of surface-water run-off. Tentative routes for trunk sewers and outfalls and possible sites for sewage treatment works and surface-water balancing ponds were selected. Costs for each layout were estimated and from these it was possible to compare likely sewerage costs for each of the outline plans. The layouts used for these comparisons were not necessarily the best or only methods of draining the areas concerned, but we believe the results obtained, which are summarised in paras. 11.43-11.50 are a broad indication of relative costs between the various plans.

Case 1. Two Major Cities

11B.3. The foul and surface-water sewerage systems of Lockington would follow natural gradients, from west to east, draining into the River Hull above Beverley. A high standard of treatment for foul sewage would be required and peak stormwater would have to be stored temporarily in order to avoid flooding in the lower reaches of the River Hull. The drainage of Limber would also follow natural gradients, from west to east, with discharge of treated or partially treated sewage to the estuary through a long outfall pipe running in a north-easterly direction. If foul sewage had to be fully treated before discharge a suitable site for a works exists to the south-west of Healing. Surface run-off could be discharged into the suitably improved existing watercourses, North Beck and East Halton Beck. Sluices and pumping stations would be required at the estuary end of each watercourse, to permit discharge at all states of the tide. Barton would drain north and Grimsby east, both to the Humber estuary, Scunthorpe west to the River Trent and Broughton east to the River Ancholme. Surface drainage of the industrial areas at Goxhill, North Killingholme and Healing would be direct to the estuary or to local watercourses, with sluices and pumping stations at the estuary discharge points. The method to be adopted for disposal of foul sewage from the industrial areas would depend upon the character of the wastes generated.

Case 2. The Radiating Form

11B.4. For the North Cave and South Cave sites, surface drainage would be from east to west to the Market Weighton canal and foul drainage from north to south, treatment being necessary before discharge to the estuary. Both foul sewage and surface-water in Swanland would be drained southwards to the estuary, with treatment of foul sewage before discharge. For Hornsea surface-drainage of the northern half would be north-easterly, into Hornsea Mere, and of the southern half, south-westerly into Holderness Drain. Balancing ponds would be required to avoid flooding. Foul drainage would be from north to south; treatment to a high standard would be necessary before discharge to Holderness Drain. Drainage of the southern part of the large Barton site would be eastwards to East Halton Beck, with sluices and pumping stations at the estuary ends of the surface-water outlets, to permit discharge at all states of the tide. Foul drainage for all Barton would be from south to north, treatment being necessary before discharge to the estuary.

Case 3. The Dispersed Form

11B.5. Foul and surface-water drainage of the various areas would follow the pattern indicated for the corresponding areas in Cases 1 and 2.

Case 3. The Linear Form

11B.6. The surface drainage and foul sewage of the Walkington-Skidby sites would receive similar treatment to the Lockington site described in para. 11B.3, but with the discharge point into the River Hull below Beverley. Surface-water and foul drainage of Barton-Deepdale-Wootton would follow the pattern adopted for Barton in Case 2, whereas that for Limber-Laceby would follow that adopted for Limber in Case 1.

Annex 11C

Transport Models

11C.1. This Annex describes the model used to evaluate the transport costs of the various outline plans. The method involved estimating traffic flows between the different sectors of the outline plans and then quantifying them in money terms. Two computer programmes were used: a synthetic evaluation programme developed by Scott Wilson Kirkpatrick and Partners in their work on the Teesside survey; and the NPK programme written and subsequently modified by Olof Gunarson and Computer Services (Birmingham) Ltd. which was made available to Scott and Wilson, Kirkpatrick and Partners in conjunction with the synthetic evaluation programme.

Background for the usage of models

11C.2. The transport model used would only give an absolute evaluation of each outline plan if the values assumed for the model parameters prove to be truly representative of the real world at the future dates concerned. Additionally an area under study should be such that the interaction with the rest of the country can be accounted for realistically. Nevertheless the models do provide a consistent framework for comparative evaluation of different outline plans.

11C.3. The comparisons made were between different land-use patterns within the Area and not with land-use patterns elsewhere in Great Britain, as the latter would have needed too many staff. Similarly manpower limitations ruled out a comparison of different urban forms which, indeed, might have shown greater cost differentials than were obtained from the different outline plans

Preparation of model input

11C.4. To enable the allocations of population and employment to particular sites to be fed into a computer the Area was broken down into 'zones'. These were chosen to satisfy the following criteria:

- *i* identify areas of particular interest;
- *ii* break the Area down into smaller areas homogeneous in respect of certain characteristics which affect travelling habits;
- *iii* provide units of approximately the same productive or attractive power;
- *iv* include all areas likely to generate or attract traffic.

There is a limit of 99 zones when using the synthetic evaluation programme, owing to the capacity of the computer. Humberside was divided into 70 zones, nine of which were interface zones between the Area and the rest of the country.

Synthetic evaluation model input

11C.5. The outline plans for each zone for a particular year were fed into the computer by specifying certain characteristics, population, employment and car ownership. In addition the spatial inter-relationships between the zones were fed into the computer, each zone's position being indicated by the co-ordinates of its centroid and its size by a distance called the intra-zonal distance. The centroids were selected by inspection and the intra-zonal distances were measures of the likely average trip length within the zone. Zonal car ownership was used as a proxy variable for zonal income.

Synthetic evaluation model

11C.6. The synthetic evaluation programme calculated person trips, traffic generation and attraction for each zone for three different purposes of travel: home-based work trips, other home-based trips and other trips. These trip attractions and productions were derived from simple equations using population, employment and car ownership.

Traffic generation equations

CBD or Non-CBD	Person Trips		
both	P(1,i)	$=$	C(1)POP(i)
both	A(1,j)	$\propto$	C(2)EMP(j)
both	P(2,i)	$=$	C(3)T(i)POP(i)
Non-CBD	A(2,j)	$\propto$	C(4)POP(j)+C(5)EMP(j)
CBD	A(2,j)	$\propto$	C(6)POP(j)+C(7)EMP(j)
both	P(3,i)	$=$	C(8)Z(i)[POP(i)+EMP(i)]
Non-CBD	A(3,j)	$\propto$	C(9)POP(j)+C(10)EMP(j)
CBD	A(3,j)	$\propto$	C(11)POP(j)+C(12)EMP(j)

where: CBD is a central business district,
P(1,i) is the person trip production for purpose 1 at zone i.
A(1,j) is the person trip attraction for purpose 1 at zone j.
C(1),.......C(12) are constants to be evaluated at the calibration stage.
POP(i) is the population of zone i.
EMP(j) is the employment of zone j.
T(i) are the trips per person in zone i, dependent on car ownership.
Journey purpose 1 is home-based work
2 is home-based other
3 is non home-based
Z(i) is total home-based trip production at zone i divided by Study Area population + employment.

The constants in the above equation were evaluated by calibration, i.e. by comparison of the results from the model assuming certain values of constants with the actual recorded flows of traffic for different journey purpose: the constants were then adjusted until the closest fit was obtained. Since the land-use/transportation surveys in the Area had not been completed, the parameters in the equations were derived from those used in the Teesside survey, modified in the light of local information available from road counts and local authority surveys. Corresponding values for person trip production and attraction for the interface zones were provided exogenously. The synthetic evaluation programme distributed the person trip production of each zone amongst the other zones according to the gravity model:

$$T(i, j) = \frac{P(i)A(j)D(i, j)^{-a}}{\sum_{k=1}^{n} A(k)D(i, k)^{-a}}$$

where: T(i,j) is the flow of traffic from zone i to zone j.
P(i) is the trip production in zone i.
A(j) is the trip attraction of zone j.
D(i,j) is the distance between zones i and j.
a is the exponent of distance.
n is the number of zones.

The trips were distributed separately for each journey purpose with appropriate distance exponents. Distance was calculated on a straight line basis between the centroids of the zones and was multiplied by a constant factor so that the distances would approximate more to actual distances. The worst drawbacks of using straight line distances were avoided by routing trips between opposite sides of the estuary via a bridge.

11C.7. Model split was calculated for each zone pair using a simple zone-to-zone index of accessibility by public transport and curves relating these indices to the percentage use of public transport according to the car ownership of the origin zone.

Synthetic evaluation model output

11C.8. Public, private and total origin destination matrices formed the basis of the output. The output was given in vehicle trips which were obtained from person trips by assuming occupancy rates for public and private vehicles. In addition total person miles by public and private transport and the number of vehicles crossing the river by public and private transport were also obtained. All these trips were on the basis of average weekday traffic over 24 hours in peak summer.

11C.9. The results themselves could be the basis of a simple costing exercise. However such an exercise would be based on straight line distances and would not take account of the quality of the road network. A further stage was introduced to take account of those two points.

Assignment model input

11C.10. The input to the assignment programme were the zone-to-zone vehicle trip matrices which formed the basic output from the synthetic evaluation programme and a coded description of the proposed road network. The zone centroids were connected with the proposed road network via hypothetical road links. The network was coded by numbering every intersection, or node, giving the length of the link connecting nodes and the assumed average speed along links.

Assignment model

11C.11. The assignment programme first worked out the routes between each pair of zones on the basis of least time. These least time routes are called 'trees'. The assignment programme then allocated the zone-to-zone movements obtained from the previous programme to these trees on an all or nothing basis, i.e. no traffic was assumed to take an alternative path even if only slightly longer.

Assignment model output

11C.12. The output from the assignment programme was a list of vehicle flows on each link in each direction and the amount of traffic turning at each intersection between any pair of links of the intersection.

Evaluation of the assignment output

11C.13. From assumptions about operating costs at different speeds and the value of occupants' time it was possible to arrive at total variable costs for each outline plan and for each year tested during the build-up period. From assumptions about crude costs of construction per mile for the different roads of different capacity, combined with the usage as indicated in the assignment, the capital cost of providing the roads to cater for these assigned flows was calculated. To this was added a similar calculation for capital costs of intersections. The timing of this outlay could also be estimated approximately. Thus for each year of the build-up period estimates of variable and capital costs were available.

11C.14. To facilitate a judgment on the alternative plans the variable and capital costs for each sketch plan were discounted back to a common base year. The costing was done on 1966 values, the rate of 8 per cent was used for discounting and the common base year chosen was 1981, the first year when the outline plans started to differ. The results are shown in Tables 11c, d and e. Operating costs of movements out of the Area (i.e. across the cordon) could not, by the method used, be allocated to the banks separately. Hence in Tables 11d and e the cost for journeys outside the cordon has been listed separately.

Some suggested improvements in the method

11C.15. The experience gained during this Study suggests some improvements to reduce the amount of work and to increase the value of these transport models:

i There is the option of using an iterative process after the distribution stage in the synthetic evaluation programme, so that trip productions and attractions are approximately equal for each zone. This option may be reasonable for home-based work trips but does not appear so reasonable for the other types of trip. The facility to select balancing by trip purpose would be a useful improvement.

ii The synthetic evaluation programme accepted actual distances, or actual times, rather than calculating straight line distances between zone centroids. Actual times could be obtained by first feeding the coded road network into the assignment programme and letting it calculate the minimum time paths between zones.

iii The assignment programme was run separately for the public and private transport networks. Apart from the extra computer costs involved in running those separately, introducing the modal split in the early evaluation procedure could cloud the main issues. Public transport networks involve major assumptions at the local level about transport policy for the future, and the planner would probably be interested in the first instances in the estimated total desired person trip movements between zones or along particular links. Thus it is recommended that a modal split should not be adopted in the first evaluation runs of a land-use proposal, and that the occupancy rate for private vehicles should be taken as unity so that the results are given as person trips.

iv There should be the facility in the synthetic evaluation programme for printing out the zone-to-zone matrices by purpose of journey as well as the total movement matrix.

v In cases where there is more than one bridge across an estuary or river there is a need for the output to give the number of crossings for each bridge separately.

vi Analysing the output of the traffic assignment programme is a lengthy business and two suggestions for improving the speed with which these results are handled are:

  a a graphical output showing the network and flows printed alongside;

  b the facility to feed into the computer the crude assumptions about costs and let the computer calculate the costs for itself.

vii Maintenance cost estimates ought to be included with the capital and operating costs.

viii It should be realised that to make effective use of this transport model both programmes involved an iterative approach whereby the original proposals were amended in the light of the model output. A lot could be done in the initial stages by having several cycles first on the synthetic evaluation programme, before moving to the much more expensive (both in time and computer running costs) assignment stage.

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Humberside

A Feasibility Study

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1969
CAMBRIDGE

A report by the Central Unit for Environmental Planning

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PREFACE

The Central Unit for Environmental Planning was set up in July 1966 within the Department of Economic Affairs, but drawing also on the resources of other departments. There were part-time members from the Department of Employment and Productivity, Ministry of Housing and Local Government, Board of Trade and Ministry of Transport.

Its first task was to carry out a detailed study of the Humberside Area and the problems of accommodating a large increase in population there—as a contribution to the Government's consideration of the national problems of population location up to the end of the century.

The Unit was assisted in its work by a Physical Planning Unit stationed at Barton-upon-Humber, which undertook the detailed study of the Area's physical structure. The Physical Planning Unit was composed of staff seconded from local planning authorities within the Study Area, directed by a Principal Planner of the Ministry of Housing and Local Government who was also a member of the Central Planning Unit.

Members of the Central Planning Unit worked together as a team without regard to departmental responsibilities. Their recommendations, like the techniques of analysis and the assessments used, are the Unit's own and do not commit in any way the government departments and the local authorities whose staff participated in the Study.

The Government have, however, authorised the publication of this Study without commitment, in order to give the local planning authorities, as well as the regional Economic Planning Councils concerned, the opportunity to express their views and to encourage public participation in the processes of planning. The Government will decide whether or not to accept any of the recommendations in the Study in the light of the comments they receive and of programmes and policies for the country as a whole.

Department of Economic Affairs
Storey's Gate
LONDON, S W1

HUMBERSIDE
A FEASIBILITY STUDY

To:

Secretary of State for Economic Affairs

The Central Unit for Environmental Planning was appointed by your predecessor, First Secretary of State, Mr. George Brown, in July 1966 and instructed to carry out a feasibility study of Humberside. I now submit a report on Humberside on behalf of the Unit.

Members of the Unit were drawn from several departments, but they worked together as a team without regard to departmental responsibilities. In this new field of work we had to develop our own techniques of analysis and assessment and we put these forward as we do our conclusions and recommendations on our own responsibility.

The Unit was greatly assisted by the work of the Physical Planning Unit and wish to record their thanks to the following members of the Physical Planning Unit and to the local planning authorities of the East Riding, Lindsey, Grimsby and Kingston upon Hull who made their services available:

M. J. Bavin, BA, Dip. TP
C. A. Collins, MAPI
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Miss A. Harland
Mrs. M. Johnson
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I. Osborne, BA, Dip.TP (Dis)
N. J. Taylor, Dip.TP (Manc), AMTPI
N. Trezise
H. S. Woledge, BA, Dip.TP, AMTPI

The Unit records with great regret the death of Mr. N. Dickenson whose abilities, enthusiasm, and knowledge of Humberside contributed much to the work of the Physical Planning Unit.

Jamas W. Varnon
Chairman, Central Unit for Environmental Planning

6th November 1968

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